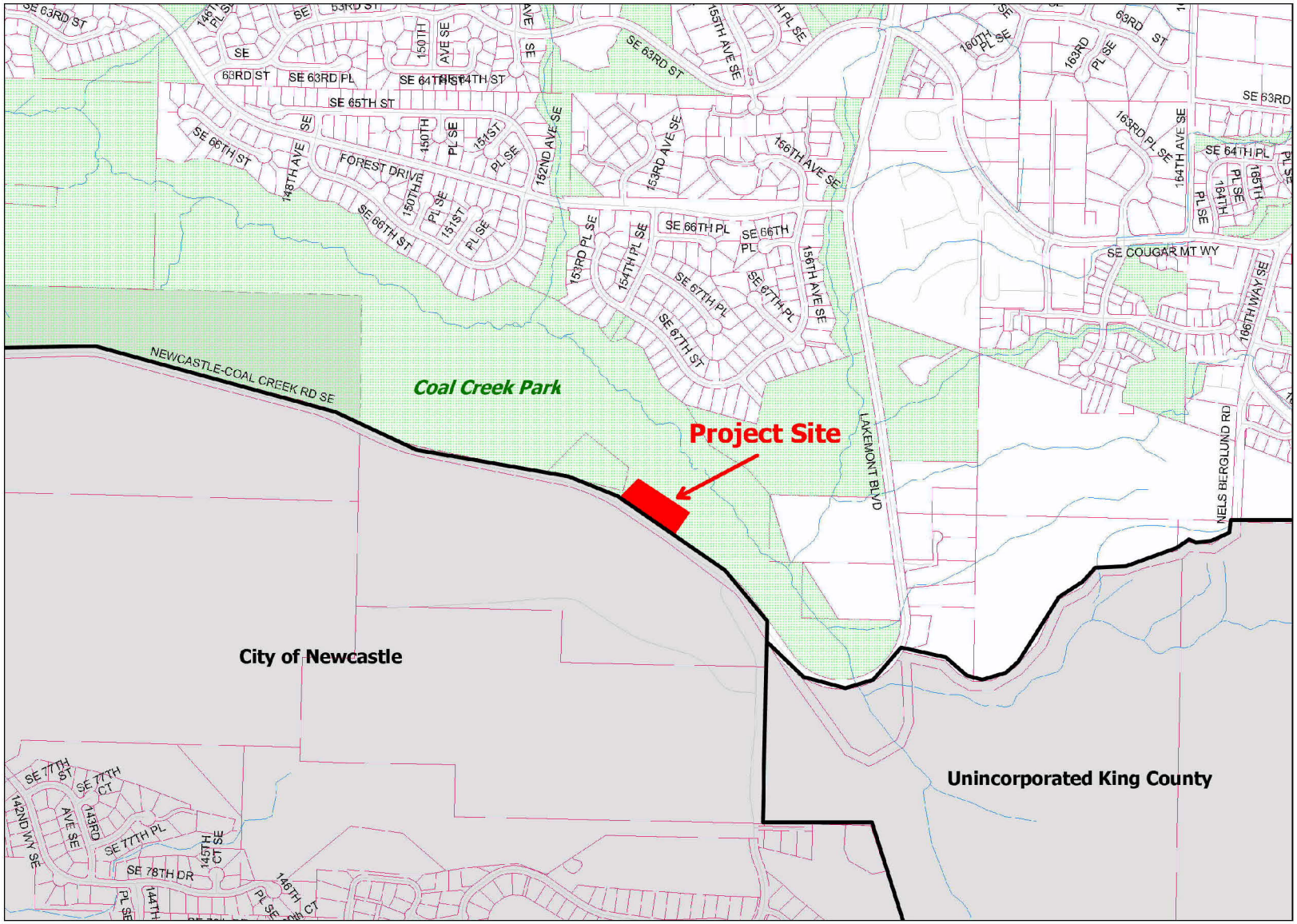
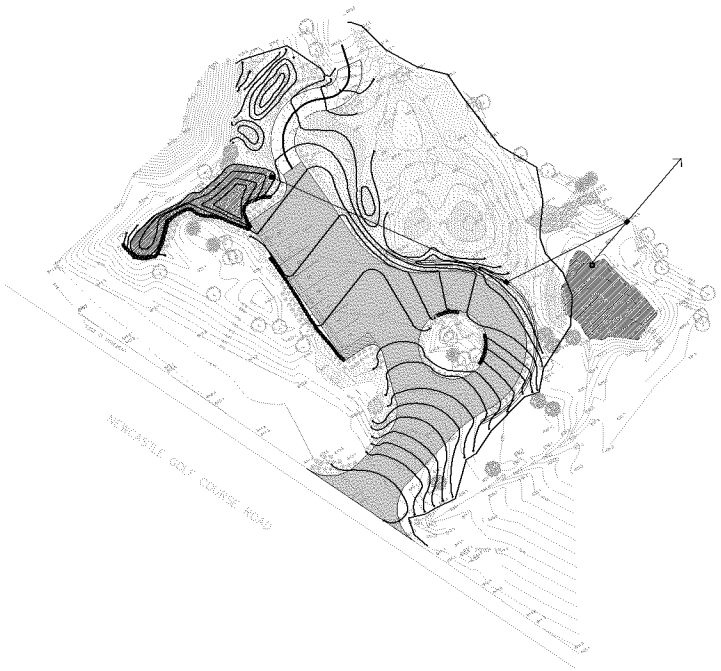
Coal Creek Park Newcastle Trailhead
File Number: 10-125203-LO

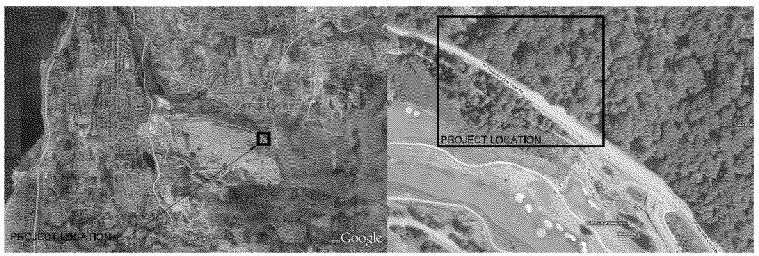


Coal Creek Newcastle Trailhead

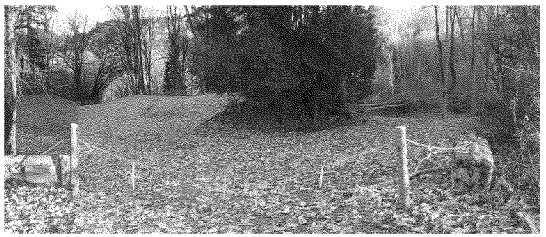
City of Bellevue, WA.



SITE PLAN
SCALE: 1" = 30'-0"



CONTEXT / VICINITY MAPS
NTS



EXISTING CONDITIONS

Calculations:

Total Proposed Impervious Area: 9547 square feet
Total Proposed Native Planting Area: 12,000 square feet
Total Proposed Rockery Length: 279 lineal feet

GENERAL NOTES:

1. All construction must be in accordance with the City of Bellevue's Development Standards; the City of Bellevue's Engineering and Utility Standards; the Bellevue City Code; the Uniform Building Codes; permit conditions; and all other applicable codes, ordinances, standards and policies. Applicable installation details are incorporated by reference to Bellevue's Engineering and Utilities published Standards. All applicable erosion control measures must be taken.
2. A copy of the approved plans must be on-site whenever construction is in progress.
3. The Contractor is responsible for obtaining any mechanical, electrical or other required permits prior to beginning construction.
4. All locations of existing utilities have been established by field survey or obtained from available records and should, therefore, be considered approximate only and not necessarily complete. It is the sole responsibility of the contractor (1) to independently verify the accuracy of all utility locations and (2) to discover and avoid any other utilities not shown which may be affected by the implementation of this plan.
5. Site shall be restored to better or equal condition in any areas affected by this work.
6. Scheduling: All work shall be coordinated with Owner to achieve minimal disturbance to roadway operation.
7. Contractor shall have proven experience in similar projects and be thoroughly familiar with City of Bellevue applicable standards and codes prior to commencement of work.
8. This layout is diagrammatic. Contractor shall coordinate exact location of points of connection to existing systems with Owner prior to beginning any work.

PROJECT DESCRIPTION

Contracted work includes site preparation, environmental protection, demolition, earthwork, furnishing and installing storm drainage systems, asphalt parking lot, soil preparation, planting, retaining walls, bioretention pond, and site restoration. For technical question, call Barker Landscape Architects. (John or Eric) 206-783-2870.

Contacts:

Client:
City of Bellevue Parks Department
Geoffrey Bradley, Project Manager
450 110th Ave. NE, P.O. Box 90012
Bellevue, WA. 98009
tel: (425) 452-2740

Landscape Architect:
Barker Landscape Architects
Contact: John Barker
1514 NW 52nd Street.
Seattle, WA 98107
206-783-2870
206-783-8312 fax.
john@barkerla.com

Surveyor & Engineer:
Lovell-Sauerland & Associates
Contact: Jerry O'Connell
19217 36th Avenue W., Suite 106
Lynnwood, WA 98036
425-775-1591
425-67217998 fax
jerryo@lsaengineering.com

Drawing Index

COAL CREEK NEWCASTLE TRAILHEAD SITE

LEGAL DESCRIPTION
PORTION OF THE SOUTHEAST QUARTER AND NORTHEAST QUARTER OF SECTION 26, TOWNSHIP 24 NORTH, RANGE 5 EAST, W.M., IN KING COUNTY, WASHINGTON.

BASIS OF BEARINGS
NAD 83/91 AS CALCULATED FROM INTERSECTION OF 155th AVENUE S.E. AND NEWCASTLE GOLF COURSE ROAD PER PLAT OF SURVEY RECODED UNDER KING COUNTY RECORDING NUMBER 9512289002 AND ROAD DEED RECORDED UNDER RECORDING NUMBER 20020606002077.

BENCH MARK
CITY OF BELLEVUE BRASS DISK IN MONUMENT CASE LOCATED 212 FEET EASTERLY OF THE INTERSECTION OF 155th AVENUE S.E. AND NEWCASTLE GOLF COURSE ROAD AS SHOWN HEREON.

ELEVATION : 656.66

DATUM : NAVD 1988

PROJECT BENCH MARK : TOP OF MAG NAIL LOCATED ADJACENT TO SURVEY AREA AS SHOWN HEREON.

ELEVATION : 644.24

CONSTRUCTION NOISE NOTES

Construction noise outside the allowable hours is prohibited per BCC 9.18.040. To be considered a violation, the construction-related noise must be audible across a property line or at least 75 feet from the source. Any violation is a civil infraction and the City may assess a monetary penalty to the individual creating the noise. The penalties are:

- A warning will be issued if no construction noise violation has been committed by the same person within the previous two years at any location within the City.
- A citation will be issued and a $125 fine imposed if one previous violation has been committed by the same person within the previous two years at any location within the City.
- A citation will be issued and a $250 fine imposed if two or more previous violation have been committed by the same person within the previous two years at any location within the City.

FOR ALL COMMERCIAL, MULTI-FAMILY, AND NEW SINGLE-FAMILY HOMES:

Construction-related noise is allowed:

- 7 am to 6 pm on weekdays
- 9 am to 6 pm on Saturdays

Construction -related noise is not allowed:

- Outside of allowable hours
- Legal holidays
- Sundays

NO.	DATE	BY	APPR.	REVISIONS
	12/1	ES	JFB	Preapplication Submittal
	10/13	ES	JFB	Land Use In Critical Areas Submittal

BARKER
LANDSCAPE ARCHITECTS, P.S.
1514 NW 52ND STREET, SEATTLE, WASHINGTON 98107
TEL (206) 783-2870 FX (206) 783-8312

Approved By

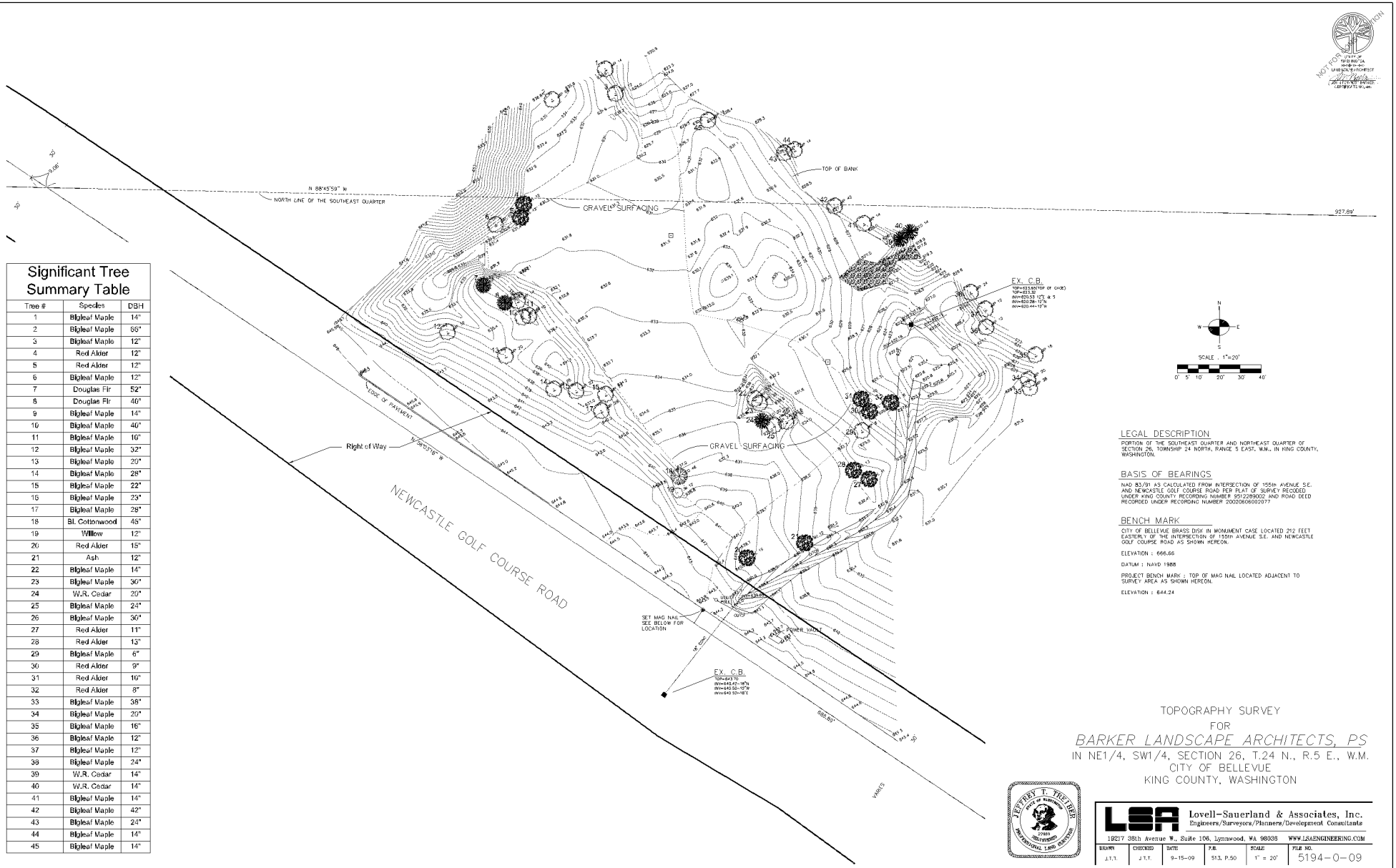
Department of Parks & Community Services
Geoffrey Bradley, Project Manager
450 110th Ave. NE
P.O. Box 90012
Bellevue, WA. 98009-
tel (425) 452-2740

City of Bellevue

JFB / ES	10/13/10
DESIGNED BY	DATE
ES / MW	10/13/10
DRAWN BY	DATE
JFB	10/13/10
CHECKED BY	DATE

City of Bellevue
Coal Creek Newcastle Trailhead

COVER
1
SHEET 1 of 9



Significant Tree Summary Table

Tree #	Species	DBH
1	Bigleaf Maple	14"
2	Bigleaf Maple	66"
3	Bigleaf Maple	12"
4	Red Alder	12"
5	Red Alder	12"
6	Bigleaf Maple	12"
7	Douglas Fir	52"
8	Douglas Fir	40"
9	Bigleaf Maple	14"
10	Bigleaf Maple	40"
11	Bigleaf Maple	10"
12	Bigleaf Maple	32"
13	Bigleaf Maple	20"
14	Bigleaf Maple	28"
15	Bigleaf Maple	22"
16	Bigleaf Maple	23"
17	Bigleaf Maple	28"
18	Bl. Cottonwood	45"
19	Willow	12"
20	Red Alder	15"
21	Ash	12"
22	Bigleaf Maple	14"
23	Bigleaf Maple	30"
24	W.R. Cedar	20"
25	Bigleaf Maple	24"
26	Bigleaf Maple	30"
27	Red Alder	11"
28	Red Alder	13"
29	Bigleaf Maple	6"
30	Red Alder	9"
31	Red Alder	10"
32	Red Alder	8"
33	Bigleaf Maple	38"
34	Bigleaf Maple	20"
35	Bigleaf Maple	16"
36	Bigleaf Maple	12"
37	Bigleaf Maple	12"
38	Bigleaf Maple	24"
39	W.R. Cedar	14"
40	W.R. Cedar	14"
41	Bigleaf Maple	14"
42	Bigleaf Maple	42"
43	Bigleaf Maple	24"
44	Bigleaf Maple	14"
45	Bigleaf Maple	14"

LEGAL DESCRIPTION

PORTION OF THE SOUTHEAST QUARTER AND NORTHEAST QUARTER OF SECTION 26, TOWNSHIP 24 NORTH, RANGE 5 EAST, W.M., IN KING COUNTY, WASHINGTON.

BASIS OF BEARINGS

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BENCH MARK

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ELEVATION : 666.66

DATUM : NAVD 1988

PROJECT BENCH MARK : TOP OF MAG NAIL LOCATED ADJACENT TO SURVEY AREA AS SHOWN HEREON.

ELEVATION : 644.24

TOPOGRAPHY SURVEY
FOR
BARKER LANDSCAPE ARCHITECTS, PS
IN NE1/4, SW1/4, SECTION 26, T.24 N., R.5 E., W.M.
CITY OF BELLEVUE
KING COUNTY, WASHINGTON

JEFFREY T. FREIBER 22989 REGISTERED PROFESSIONAL LAND SURVEYOR STATE OF WASHINGTON

Lovell-Sauerland & Associates, Inc.
Engineers/Surveyors/Planners/Development Consultants
19217 38th Avenue W., Suite 106, Lynnwood, WA 98036 WWW.LSAENGINEERING.COM

DRAWN	CHECKED	DATE	F.B.	SCALE	FILE NO.
J.T.T.	J.T.T.	9-15-09	513, P.50	1" = 20'	5194-0-09

NO.	DATE	BY	APPR.	REVISIONS
	12/1	ES	JFB	Preapplication Submittal
	10/13	ES	JFB	Land Use In Critical Areas Submittal

BARKER
LANDSCAPE ARCHITECTS, P. S.
1111 N. 39th STREET, SEATTLE, WASHINGTON 98103
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Approved By

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Bellevue, WA. 98009
tel:(425) 452-2740

City of Bellevue

JFB / ES	10/13/10
DESIGNED BY	DATE
ES / MW	10/13/10
DRAWN BY	DATE
JFB	10/13/10
CHECKED BY	DATE

City of Bellevue
Coal Creek Newcastle Trailhead

EXISTING CONDITIONS
2
SHEET 2 of 9

TESC/DEMO LEGEND

50' Steep Slopes Buffer	Preserve Existing Tree
Tree Protection Fencing	Remove Existing Tree
Right of Way	Quarry Spall / Gravel Area to Be Removed
Limit of Work	Existing Quarry Spall / Gravel to Be Preserved
Silt Fence	Selectively Clear and Grub - Clear Invasives, Preserve Native Shrubs and Trees - Hand Clear and Grub Only Within Tree Driplines
Temporary Chainlink Fencing	

TEMPORARY EROSION & SEDIMENTATION CONTROL NOTES:

1. All clearing limits shall be visibly marked prior to clearing.
2. The constructed erosion control and sedimentation plan shall be approved by the City of Bellevue prior to performing any site grading or clearing.
3. The implementation of temporary erosion and sedimentation control (TESC) measures and the construction, maintenance, and replacement of these facilities is the responsibility of the contractor.
4. The TESC facilities must be constructed in conjunction with all construction activities and in such a manner as to ensure that sediment laden water does not enter the public drainage system or flow off site.
5. The TESC facilities shall be inspected daily by the contractor and maintained as necessary or as directed by the engineer to ensure continuous functioning.
6. Stabilized construction entrances shall be installed at the beginning of construction and maintained for the duration of the project. Additional measures may be required to insure that all paved areas are kept clean for the duration of the project.
7. All catch basins in the vicinity of construction shall be protected with filter fabric placed between the frame and grate or as directed by the engineer. Clean regularly: no more than 1 inch of sediment will be allowed to accumulate over filter fabric.
8. Any area stripped of vegetation where no further work is anticipated for a period of 15 days shall be immediately stabilized with approved TESC methods such as mulching, erosion blankets, plastic sheeting or as directed by the engineer.
9. All steep slope excavations greater than 2:1 shall be covered at the end of each working day.
10. All disturbed areas shall be covered with 7" depth woodchip mulch.
11. Any vegetation not in the construction area shall be left undisturbed
12. Field verify location of existing trees & boulders.
13. The TESC facilities are the minimum requirements for anticipated site conditions. During the construction period, theseTESC facilities shall be upgraded by contractor as directed by the engineer for unexpected storm events.
14. All storm drain facilities within the project boundary are to be cleared of sediment and debris prior to final acceptance of the project.

NO.	DATE	BY	APPR.	REVISIONS
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	10/13	ES	JFB	Land Use in Critical Areas Submittal

BARKER
LANDSCAPE ARCHITECTS, P.S.
[illegible] TH (206) 783 2579 TX (206) 783 3212

Approved By

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Geoffrey Bradley, Project Manager
450 110th Ave. NE
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tel:(425) 452-2740

City of Bellevue

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City of Bellevue
Coal Creek Newcastle Trailhead

TESC/DEMO PLAN
3
SHEET 3 of 9

CLEARING AND GRADING STANDARD NOTES:

1. All clearing & grading construction must be in accordance with City of Bellevue (COB) Clearing & Grading Code; Clearing & Grading Erosion Control Standard Details (EC-1 through EC-23); Development Standards; Land Use Code; Uniform Building Code; permit conditions; and all other applicable codes, ordinances, and standards. The design elements within these plans have been reviewed according to these requirements. Any variance from adopted erosion control standards is not allowed unless specifically approved by the City of Bellevue Department of Planning & Community Development (PCD) prior to construction.

2. A copy of the approved plans must be on-site during construction. The applicant is responsible for obtaining any other required or related permits prior to beginning construction.

3. All locations of existing utilities have been established by field survey or obtained from available records and should, therefore, be considered only approximate and not necessarily complete. It is the sole responsibility of the contractor to independently verify the accuracy of all utility locations and to discover and avoid any other utilities not shown which may be affected by the implementation of this plan.

4. The area to be cleared and graded must flagged by the contractor and approved by the clearing & grading inspector prior to beginning any work on the site.

5. A reinforced silt fence must be installed in accordance with COB EC-5 and located as shown on the approved plans or per the clearing & grading inspector, along slope contours and down slope from the building site.

6. A hard-surface construction access pad is required per Clearing & Grading Standard Detail EC-1 or EC-2. This pad must remain in place until paving is installed.

7. Clearing will be limited to the areas within the approved disturbance limits. Exposed soils must be covered at the end of each working day when working from October 1st through April 30th. From May 1st through September 30th, exposed soils must be covered at the end of each construction week and also at the threat of rain.

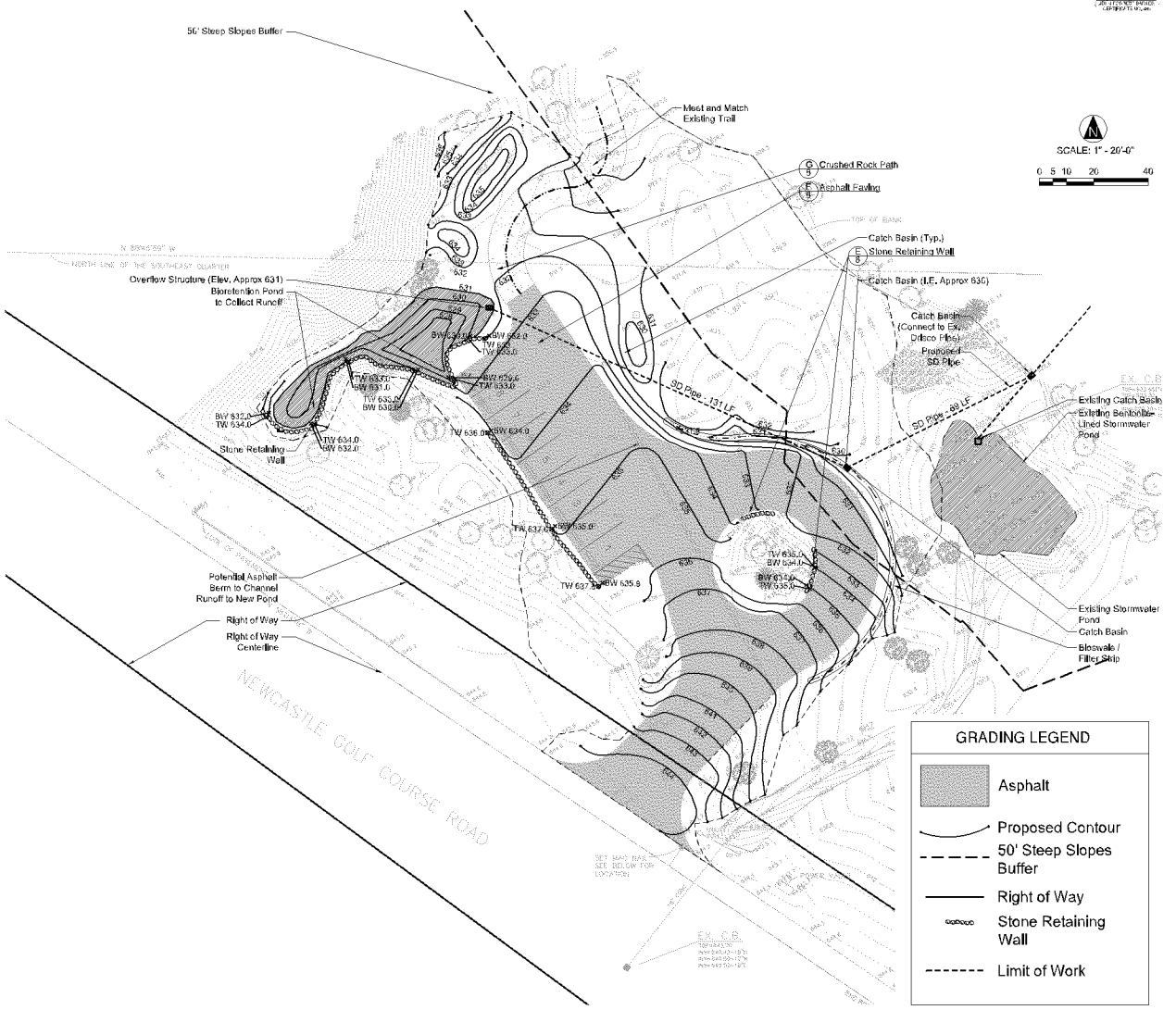
8. Any excavated material removed from the construction site and deposited on property within the City limits must be done in compliance with a valid clearing & grading permit. Locations for the mobilization area and stockpiled material must be approved by the clearing & grading inspector at least 24 hours in advance of any stockpiling.

9. To reduce the potential for erosion of exposed soils, or when rainy season construction is permitted, the following Best Management Practices (BMPs) are required: U+2022 Preserve natural vegetation for as long as possible or as required by the clearing & grading inspector. U+2022 Protect exposed soil using plastic (EC-14), erosion control blankets, straw or mulch (COB Guide to Mulch Materials: Rates, and Use Chart), or as directed by the clearing & grading inspector. U+2022 Install catch basin inserts as required by the clearing & grading inspector or permit conditions of approval. U+2022 Install a temporary sediment pond, a series of sedimentation tanks, temporary filter vaults, or other sediment control facilities. Installation of exposed aggregate surfaces requires a separate effluent collection pond on-site.

10. Final site grading must direct drainage away from all building structures at a minimum 2% slope, per the Uniform Building Code.

11. The contractor must maintain a sweeper on-site during earthwork and immediately remove soil that has been tracked onto paved areas as result of construction.

12. A public information sign listing 24-hour emergency phone numbers for the city and the contractor may be provided to the applicant at the time the clearing & grading permit is issued. The applicant must post the sign at the project site in full view of the public and the contractors, and it must remain posted until final sign-off by the clearing & grading inspector.



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BARKER LANDSCAPE ARCHITECTS, P.S.
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Approved By

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tel: (425) 452-2740

City of Bellevue

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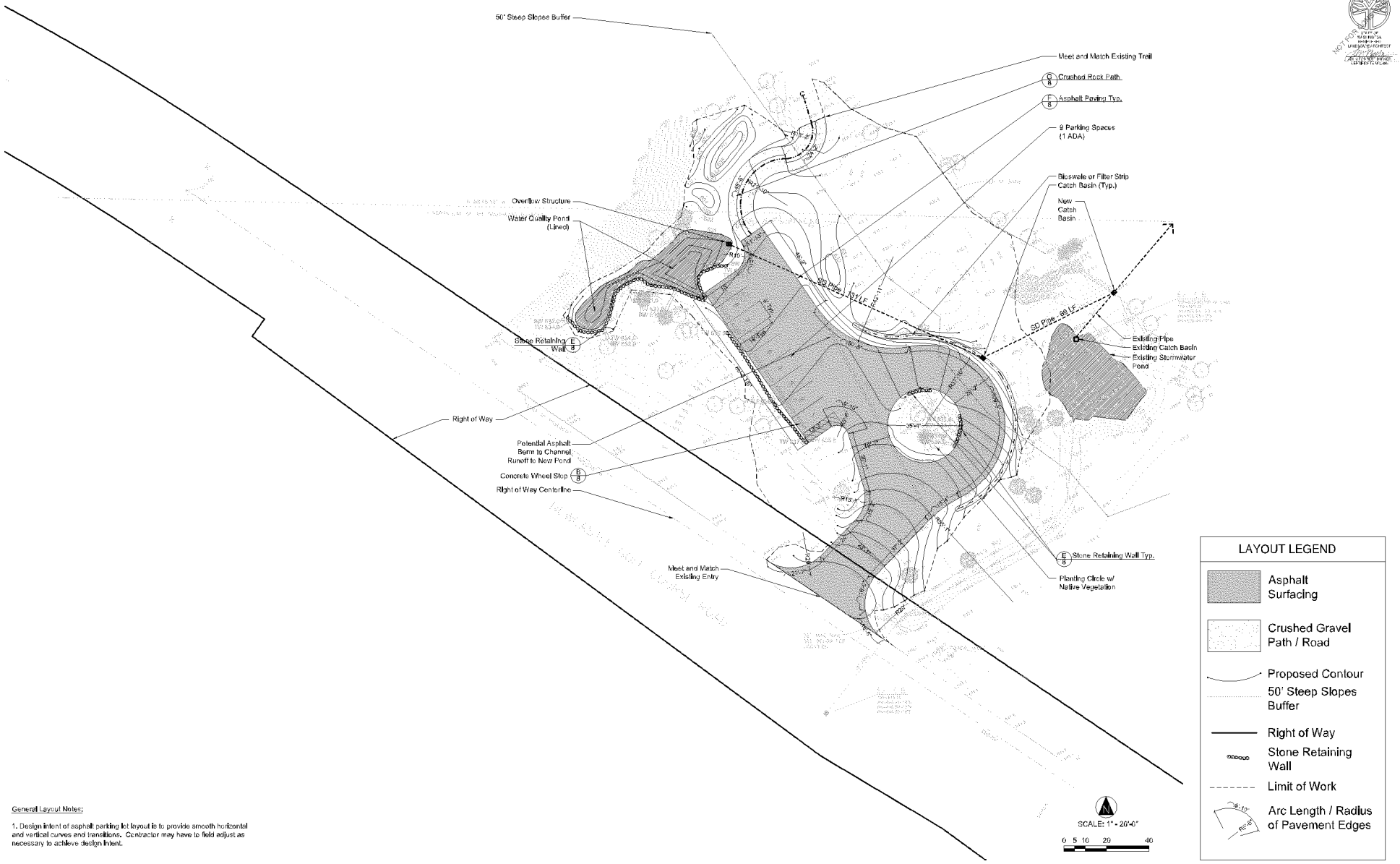
City of Bellevue
Coal Creek Newcastle Trailhead

GRADING PLAN
4
SHEET 4 of 9



General Layout Notes:

1. Design intent of asphalt parking lot layout is to provide smooth horizontal and vertical curves and transitions. Contractor may have to field adjust as necessary to achieve design intent.

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BARKER
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City of Bellevue

Coal Creek Newcastle Trailhead

LAYOUT PLAN
5
SHEET 5 of 9

GENERAL PLANTING NOTES:

1. Plant selection shall be consistent with the Bellevue Land Use Code, Section 20.20.520, Landscape Development.

2. Plants shall be selected and sited to produce a hardy and drought-resistant landscape area. Selection shall consider soil type and depth, the amount of maintenance required, spacing, exposure to sun and wind, the slope and contours of the site, and compatibility with existing native vegetation preserved on the site. Preservation of existing vegetation is strongly encouraged.

3. Prohibited materials. Plants listed as prohibited in the Bellevue Land Use Code are prohibited in required landscape areas. Additionally, there are other plants that may not be used if identified in Bellevue Land Use Code as potentially damaging to sidewalks, roads, underground utilities, drainage improvements, foundations, or when not provided with enough growing space.

4. All plants shall conform to American Association of Nurserymen (AAN) grades and standards as published in the "American Standard for Nursery Stock" manual.

5. Plants shall meet the minimum size standards established in other sections of Bellevue Land use Code, Section 20.20.520 Landscape Development.

6. Multiple-stemmed trees may be permitted as an option to single-stemmed trees for required landscaping provided that such multiple-stemmed trees are at least ten (10) feet in height and that they are approved by the Planning Official prior to installation.

7. Soils in planting areas shall have adequate porosity to allow root growth. Soils which have been compacted to a density greater than one and three-tenths (1.3) grams per cubic centimeters shall be loosened to increase aeration to a minimum depth of twenty-four (24) inches or to the depth of the largest plant root ball, whichever is greater. Imported topsoils shall be tilled into existing soils to prevent a distinct soil interface from forming After soil preparation is completed, motorized vehicles shall be kept off to prevent excessive compaction and underground pipe damage. The organic content of soils in any landscape area shall be as necessary to provide adequate nutrient and moisture-retention levels for the establishment of plantings. See Bellevue Clearing and Grading Development Standards for mulch requirements.

8. Required plantings, except turf or areas of established ground cover, shall be covered with two inches or more of organic mulch to minimize evaporation and runoff. Mulch shall consist of materials such as yard waste, sawdust, and/or manure that are fully composted.

9. All mulches used in planter beds shall be kept at least six (6) inches away from the trunks of shrubs and trees.

10. All required landscaped areas, particularly trees and shrubs, must be protected from potential damage by adjacent uses and development, including parking and storage areas. Protective devices such as bollards, wheel stops, trunk guards, root guards, etc., may be required in some situations.

PLANT SCHEDULE

SMALL TREES

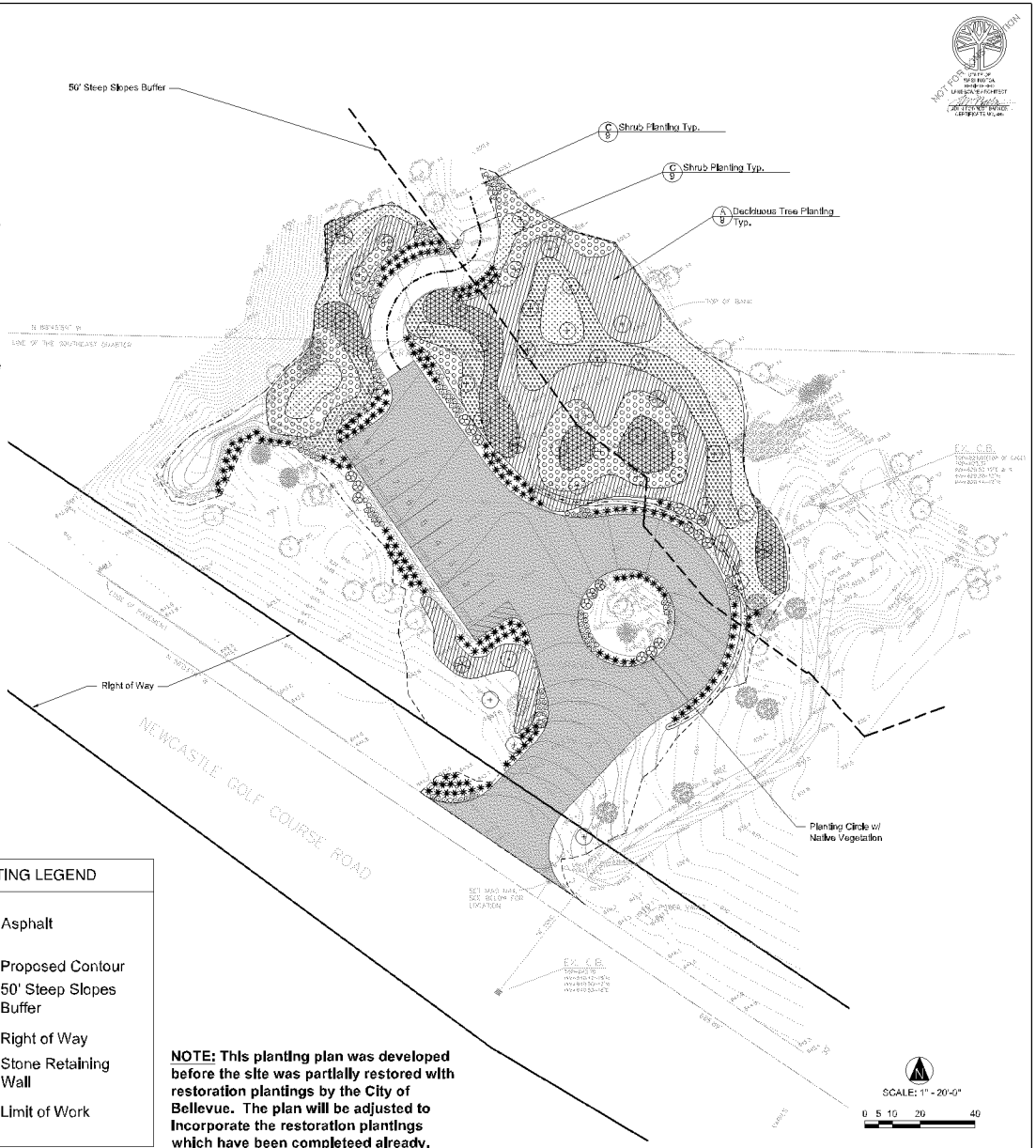
SYMBOL	SCIENTIFIC NAME	COMMON NAME	SIZE	SPACING	REMARKS	TOTAL QUANT.
	Amelanchier spp.	Serviceberry	B & B		10' - 12' ht	9
	Acer Circinatum	Vine Maple	B & B		10' - 12' ht	31
	Corylus Comuta	Beaked Hazelnut	B & B		5 gallon	7

SHRUBS

SYMBOL	SCIENTIFIC NAME	COMMON NAME	SIZE	SPACING	REMARKS	TOTAL QUANT.
	Philadelphus Lewisii	Mock Orange	1 Gal.		10' - 12' ht	19
	Polystichum munitum	Sword Fern	1 Gal.			210
	Mahonia nervosa	Dull Oregon Grape	1 Gal.			137
	Vaccinium ovatum	Evergreen Huckleberry	1 Gal.	24" o.c.	1' - 3' ht	500
	Rubus spectabilis	Salmonberry	1 Gal.	36" o.c.	4' - 5' ht	100
	Oemleria cerasiformis	Indian Plum	1 Gal.	18" o.c.	1' - 2' ht	380
	Gaultheria shallon	Salal	1 Gal.	24" o.c.	1' - 2' ht	830
	Rosa Gymnocarpa	Baldhip Rose	1 Gal.	24" o.c.		605

GROUNDCOVERS & PERENNIALS

SYMBOL	SCIENTIFIC NAME	COMMON NAME	SIZE	SPACING	REMARKS	TOTAL QUANT.
	Native erosion control hydroseed	Native erosion control hydroseed	n/a		seed all exposed soil	n/a



PLANTING LEGEND

- Asphalt
- Proposed Contour
- 50' Steep Slopes Buffer
- Right of Way
- Stone Retaining Wall
- Limit of Work

NOTE: This planting plan was developed before the site was partially restored with restoration plantings by the City of Bellevue. The plan will be adjusted to incorporate the restoration plantings which have been completeed already.

NO.	DATE	BY	APPR.	REVISIONS
	12/1	ES	JFB	Preapplication Submittal
	10/13	ES	JFB	Land Use In Critical Areas Submittal

BARKER
LANDSCAPE ARCHITECTS, P.S.

Approved By

Department of Parks & Community Services
Geoffrey Bradley, Project Manager
450 110th Ave. NE
P.O. Box 90012
Bellevue WA, 98009
tel: (425) 452-2740

City of Bellevue

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DESIGNED BY	DATE
ES / MW	10/13/10
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CHECKED BY	DATE

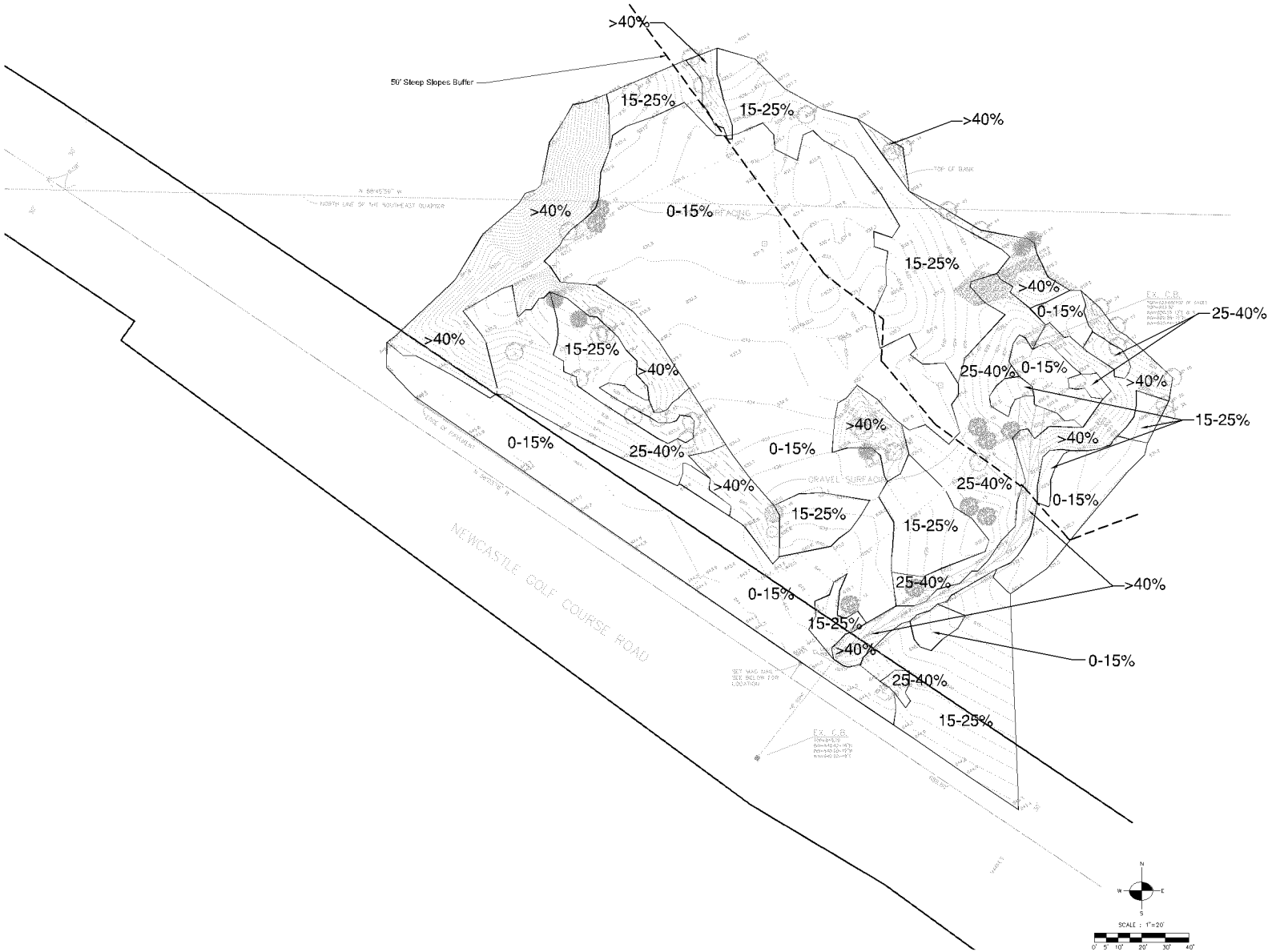
City of Bellevue

Coal Creek Newcastle Trailhead

PLANTING PLAN

6

SHEET 6 of 9



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BARKER LANDSCAPE ARCHITECTS, P.S.

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Department of Parks & Community Services

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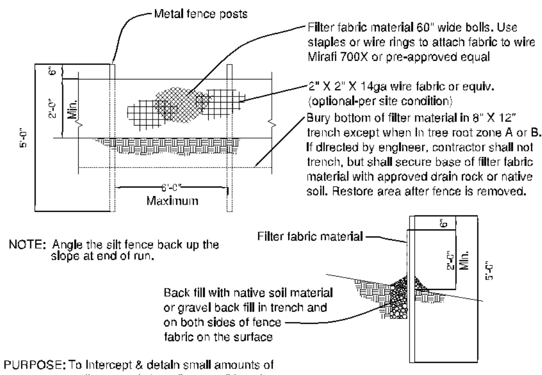
City of Bellevue

Coal Creek Newcastle Trailhead

SLOPE CATEGORIES
7
SHEET 7 of 9

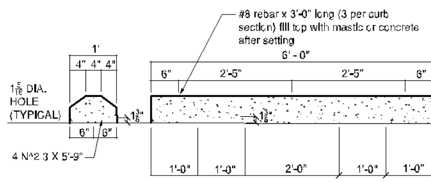


Metal fence posts
Filter fabric material 60" wide bolls. Use staples or wire rings to attach fabric to wire Mirafi 700X or pre-approved equal
2" X 2" X 14ga wire fabric or equiv. (optional-per site condition)
Bury bottom of filter material in 8" X 12" trench except when in tree root zone A or B. If directed by engineer, contractor shall not trench, but shall secure base of filter fabric material with approved drain rock or native soil. Restore area after fence is removed.
6'-0" Maximum
5'-0"
2'-0" Min.
6"
Filter fabric material
Back fill with native soil material or gravel back fill in trench and on both sides of fence fabric on the surface

NOTE: Angle the silt fence back up the slope at end of run.

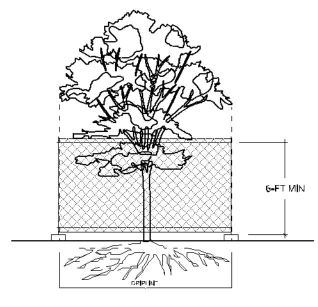
PURPOSE: To intercept & detain small amounts of sediment and sheet flow conditions from disturbed areas during construction and to reduce the velocity of sheet flows.

A SILT FENCE
NTS



NOTES:
Available from Renton Concrete Products or Utility Vault Co.

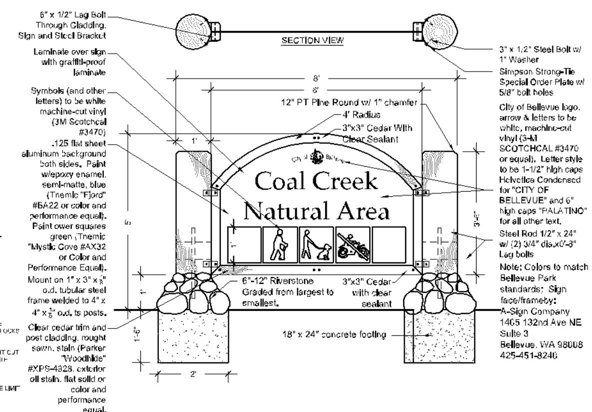
B CONCRETE WHEEL STOP
NTS



NOTES:

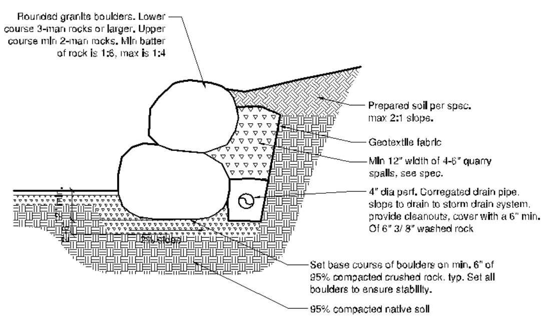
1. 6-FT. HIGH TEMPORARY CHAIN LINK FENCE SHALL BE PLACED AT THE DRIPLINE OF THE TREE TO BE SAVED. FENCE SHALL COMPLETELY ENCIRCLE THE TREE(S). INSTALL FENCE POSTS USING PIER BLOCKS ONLY. AVOID DRIVING POSTS OR STAKES INTO MAJOR ROOTS.
2. FOR ROOTS OVER 1-IN DIA. THAT ARE DAMAGED DURING CONSTRUCTION, MAKE A CLEAN, STRAIGHT CUT TO REMOVE THE DAMAGED PORTION. ALL EXPOSED ROOTS SHALL BE TEMPORARILY COVERED WITH DAMP BURLAP TO PREVENT DRYING, AND SHALL BE COVERED WITH SOIL AS SOON AS POSSIBLE.
3. WORK WITHIN PROTECTION FENCE SHALL BE DONE MANUALLY. NO STOCKPILING OF MATERIALS, VEHICULAR TRAFFIC, OR STORAGE OF EQUIPMENT OR MACHINERY SHALL BE ALLOWED WITHIN THE LIMIT OF THE FENCING.

C TREE PROTECTION FENCING
NTS



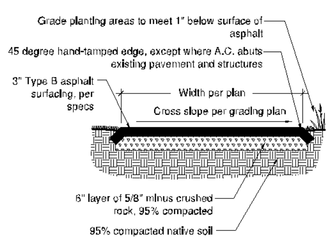
6" x 1/2" Lag Bolt Through Cladding, Sign and Steel Bracket
SECTION VIEW
3" x 1/2" Steel Bolt w/ 1" Washer
Simpson Strong-Tie Special Order Plate w/ 5/8" bolt holes
Laminate over sign with graffiti-proof laminate
Symbols (and other letters) to be white machine-cut vinyl (3M Scotchcal #3470)
.125 flat sheet aluminum background both sides. Paint w/epoxy enamel, semi-matte, blue (Tnemic "Fjord" #8A22 or color and performance equal). Paint over squares green (Tnemic "Mystic Cove #AX32 or Color and Performance Equal).
Mount on 1" x 3" x 1/8" o.d. tubular steel frame welded to 4" x 4" x 1/8" o.d. ts posts.
Clear cedar trim and post cladding, rough sawn, stain (Parker "Woodhide" #XPS-4328, exterior oil stain, flat solid or color and performance equal.
City of Bellevue logo, arrow & letters to be white, machine-cut vinyl (3-M SCOTCHCAL #3470 or equal). Letter style to be 1-1/2" high caps Helvetica Condensed for "CITY OF BELLEVUE" and 6" high caps "PALATINO" for all other text.
Steel Rod 1/2" x 24" w/ (2) 3/4" diax0-8" Lag bolts
Note: Colors to match Bellevue Park standards; Sign face/frameby: A-Sign Company 1405 132nd Ave NE Suite 3 Bellevue, WA 98005 425-451-8246
8'
6'
12" PT Pine Round w/ 1" chamfer
4' Radius
3"x3" Cedar With Clear Sealant
Coal Creek Natural Area
6"-12" Riverstone Graded from largest to smallest.
3"x3" Cedar with clear sealant
18" x 24" concrete footing
2'

D ENTRANCE SIGN
NTS



Rounded granite boulders. Lower course 3-man rocks or larger. Upper course min 2-man rocks. Min batter of rock is 1:6, max is 1:4
Prepared soil per spec. max 2:1 slope.
Geotextile fabric
Min 12" width of 4-6" quarry spalls, see spec.
4" dia perf. Corregated drain pipe, slope to drain to storm drain system, provide cleanouts, cover with a 6" min. Of 6" 3/ 8" washed rock
Set base course of boulders on min. 6" of 95% compacted crushed rock, typ. Set all boulders to ensure stability.
95% compacted native soil

E STONE RETAINING WALL
NTS

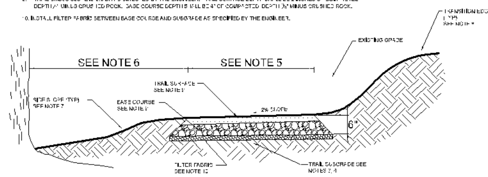


Grade planting areas to meet 1" below surface of asphalt
45 degree hand-tamped edge, except where A.C. abuts existing pavement and structures
3" Type B asphalt surfacing, per specs
Width per plan
Cross slope per grading plan
6" layer of 5/8" minus crushed rock, 95% compacted
95% compacted native soil

F ASPHALT PAVING
NTS

NOTES

1. APPROPRIATE DRAINAGE SHALL BE PROVIDED PER CITY OF BELLEVUE REQUIREMENTS.
2. TRAIL ALIGNMENTS SUBJECT TO REVIEW AND APPROVAL BY THE ENGINEER PRIOR TO START OF CONSTRUCTION OF TRAIL.
3. TRAIL SUBGRADE TO BE COMPACTED TO 95% DENSITY. SUBGRADE SHALL CONSIST OF UNDISTURBED NATIVE SOIL.
4. TRAIL SUBGRADE TO BE TREATED WITH APPROVED HERBICIDE PRIOR TO FINAL INSTALLATION OF WOOD CHIP SURFACE.
5. TRAIL WIDTH TO BE SPECIFIED BY THE ENGINEER. GENERAL WIDTHS RANGE BETWEEN 4' TO 6'.
6. TRAIL SHALL HAVE A 2' MINIMUM HORIZONTAL CLEARANCE TO ANY OBSTRUCTION AND A 7' MINIMUM VERTICAL (BRANCH) CLEARANCE FROM TRAIL SURFACE. OBSTRUCTION CLEARANCE REQUIRED BOTH SIDES OF TRAIL.
7. TRAIL SIDESLOPE SHALL BE GRADED WITH TOPSOIL BACKFILL AT A 3:1 SLOPE. GRADING SHALL BE DONE SO THAT ACCUMULATION OF RUN-OFF DOES NOT COLLECT AT BOTTOM OF SLOPE. COMPACT AS REQUIRED.
8. MINIMUM 2' WIDE TRANSITION EDGE REQUIRED PRIOR TO START OF SIDE SLOPE. COVER WITH TOPSOIL AND SEED AS REQUIRED BY ENGINEER.
9. TRAIL CROSS SLOPE IS 2% OR AS DIRECTED BY THE ENGINEER. TRAIL SURFACE DEPTH SHALL BE 2 INCHES OF COMPACTED DEPTH 1/4" MINUS CRUSHED ROCK. BASE COURSE DEPTH SHALL BE 4" OF COMPACTED DEPTH 3/4" MINUS CRUSHED ROCK.
10. INSTALL FILTER FABRIC BETWEEN BASE COURSE AND SUBGRADE AS SPECIFIED BY THE ENGINEER.



G CRUSHED ROCK PATH
NTS

NO.	DATE	BY	APPR.	REVISIONS
	12/1	ES	JFB	Preapplication Submittal
	10/13	ES	JFB	Land Use in Critical Areas Submittal

BARKER LANDSCAPE ARCHITECTS, P.S.

Approved By

Department of Parks & Community Services

Geoffrey Bradley, Project Manager
450 110th Ave. NE
P.O. Box 90012
Bellevue, WA. 98009
tel: (425) 452-2740

City of Bellevue

JFB / ES	10/13/10
DESIGNED BY	DATE
ES / MW	10/13/10
DRAWN BY	DATE
JFB	10/13/10
CHECKED BY	DATE

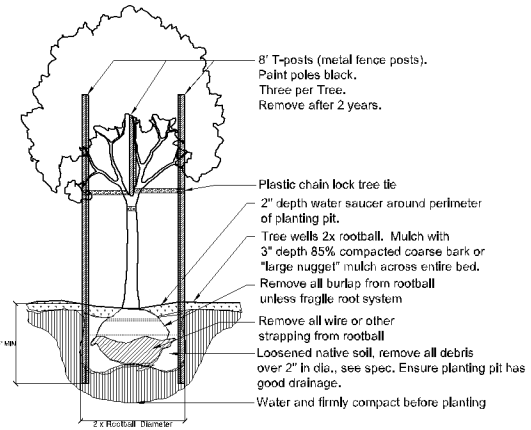
City of Bellevue

Coal Creek Newcastle Trailhead

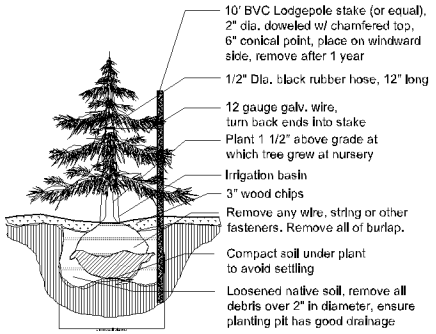
SITE DETAILS I

8

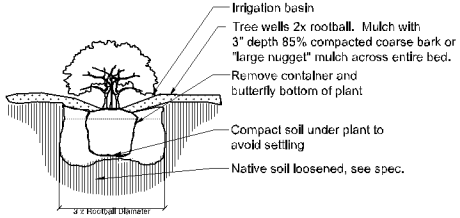
SHEET 8 of 9



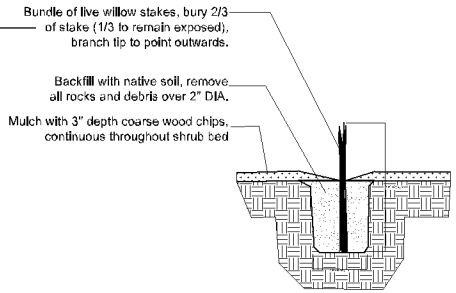
A DECIDUOUS TREE PLANTING
NTS



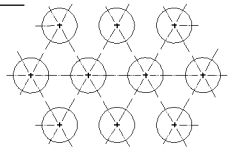
B CONIFEROUS TREE PLANTING
NTS



C SHRUB PLANTING
NTS

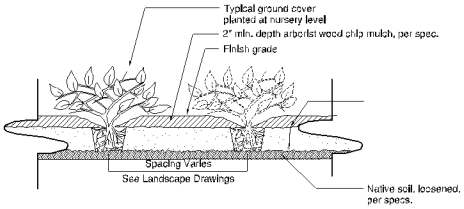


D LIVE WILLOW / DOGWOOD STAKE PLANTING
NTS



(1) All groundcover shall be planted at equal triangular spacing or on center spacing as specified on planting plan

(2) Locate groundcover one half of specified spacing distance from any curb, sidewalk, or other hard surface, unless otherwise specified



E GROUNDCOVER PLANTING
NTS

NO.	DATE	BY	APPR.	REVISIONS
	12/1	ES	JFB	Preapplication Submittal
	10/13	ES	JFB	Land Use In Critical Areas Submittal

BARKER
LANDSCAPE ARCHITECTS, P.S.
TH (206) 783 2670 TX (206) 783 2212

Approved By

Department of Parks & Community Services
Geoffrey Bradley, Project Manager
450 110th Ave. NE
P.O. Box 90012
Bellevue WA, 98009
tel:(425) 452-2740

City of Bellevue

JFB / ES	10/13/10
DESIGNED BY	DATE
ES / MW	10/13/10
DRAWN BY	DATE
JFB	10/13/10
CHECKED BY	DATE

City of Bellevue
Coal Creek Newcastle Trailhead

SITE DETAILS II
9
SHEET 9 of 9

Coal Creek – Newcastle Trailhead

Critical areas Land Use Permit:

Narrative Description

BARKER
LANDSCAPE
ARCHITECTS, P.S.

Prepared by
Barker Landscape Architects
October 14, 2010

Description of Project Site, Including Landscape Features, Existing Development, and Site History as Applicable:

The project site is a trailhead adjacent to Coal Creek, along Newcastle Golf Club Road in Bellevue. A significant landscape feature near the site is Coal Creek, which runs through this steep ravine in Coal Creek Park, to the north of the site. The north-facing slope on the south side of Coal Creek is a Steep Slope Critical Area – Coal Creek is directly to the north of the site at the bottom of the ravine. Newcastle Golf Club road, a city arterial road, is adjacent to the south edge of the site, and is how the site is accessed. The slope on the south side of the creek is within Coal Creek Park. Coal Creek ultimately empties into Lake Washington. Newcastle Golf Club lies directly to the south of the site, directly across the adjacent road, Newcastle Golf Club Road.

Description of How the Design Constitutes the Minimum Necessary Impact to the Critical Area:

Through several visits to the site, we have come to the conclusion that our proposed design constitutes the minimum impact to this Critical Area. There are several reasons to reach this conclusion. First, our proposed design minimizes the amount of proposed impervious area added to the existing site, thereby minimizing the amount of stormwater runoff from the impervious area. Second, the proposed design sends avoids the financial impacts associated with installation of costly new stormwater infrastructure by tying into an existing stormwater pipe leading to Coal Creek. The stormwater runoff from the proposed parking lot, will be stored in a new water quality pond at the west edge of the site and will tie into the existing stormwater pipe via tightline, thus avoiding infiltration which has been discouraged due to geotechnical investigations which revealed the presence of large amounts of tailings from a history of coal mining in the area. Runoff from the

eastern portion of the site, which slopes north-northeast toward the existing detention pond (which we have been informed has been sealed due to leakage problems, and we have been advised not to add any stormwater to) will be captured by biofiltration swales and/or filter strips flanking the site, and will naturally treat runoff from this portion of the site and send the treated water into the existing stormwater pipe as well. Third, we are also proposing to plant over 12,000 square feet of native plant restoration. Fourth, we propose to remove all invasive plants in the site vicinity, improving the ecology of the site.

Description of Why There is No Feasible Alternative With Less Impact to the Critical Area, Critical Area Buffer, or Critical Area Structure Setback:

Because this existing trailhead serves the trail system within Coal Creek Park, there is a continued need for vehicular access to the trail. We have minimized the footprint of the parking lot as much as possible, and reduced the amount of impervious surface to the maximum extent possible while still providing nine parking spaces for public recreational use of this trail. There is no room between the slope and the roadway to move this trailhead any further away from the top of the slope, so avoiding the steep slope Critical Area Buffer entirely is not an option.

The prudence of placing a trailhead parking lot in this location has been questioned, given that a pre-existing trailhead parking lot already exists just up Newcastle Golf Club Road at the Red Town Trailhead at Cougar Mountain Park. However, to access Coal Creek Park from this trailhead, users would need to cross Lakemont Boulevard. This would necessitate building either a footbridge or a crosswalk across Lakemont Boulevard. The cost of a constructing bridge across the street is prohibitive. Additionally, it has been pre-established by communications with Bellevue's Transportation department that they would not support the installation of a crosswalk across Lakemont Boulevard.

Another factor we considered was the potential long-term function of the site if this project is not constructed. Since the existing site has already been disturbed (cleared and overlaid with quarry spalls), currently there is little to no function being provided by the site, so by building the project, which includes restoration planting, long-term function of the site will actually be improved.

Description of Alternatives Considered and Why the Alternative Selected Is Preferred:

1. The first alternative considered was to build a footbridge across Lakemont Boulevard from the Red Town Trailhead at Cougar Mountain Park, providing access to Coal Creek Park from that location. The cost of building a footbridge over Lakemont Boulevard would be quite high. Although this alternative would provide safe access across Lakemont Blvd.the cost would be cost prohibitive. Because of the Transportation nature of crossing Lakemont Blvd the structure would most likely require ADA access. Initial cost estimates range in the neighborhood of 1.0 to 1.5 million dollars for this facility. In addition, this alternative provides no additional parking and shared use of the existing Cougar Mountain parking lot.

2. Another alternative considered was to install a crosswalk, with or without a control structure, across Lakemont Boulevard from the Red Town Trailhead to provide access to

Coal Creek Park from that location. While the cost of a crosswalk would be feasible, this type of structure has been deemed unsafe and would not be permitted by the City of Bellevue's Transportation Department at this location because of sight distance issues and vehicular traffic speeds on Lakemont Blvd.

3. A third alternative would be to locate the parking lot directly across from Cougar Mountain parking lot. Although from a recreational use perspective this would be an ideal site, there is evidence of a coal seam directly under this site. Surface subsidence is clearly visible at this location.

4. The fourth alternative considered was to take advantage of the existing disturbed site at Newcastle Golf Club road, and create a new trailhead parking area here. This site has already been extensively impacted by past work done by the City of Bellevue Utility Department. Taking advantage of this site would avoid impacting any previously undisturbed site in close proximity to the site. The site is already cleared and covered in quarry spalls, so the groundwork has already been laid for construction on this site.

5. Another alternative would be to locate the trailhead in another location site along Lakemont Blvd, but this would involve impacting a site that has not been previously impacted.

We believe that Option 4 has the least impact to the critical area, due to the fact that it minimizes impervious surface and improves habitat and slope stability of the site by maximizing the area of restored plantings onsite. New parking here would also serve as a valuable community amenity. The proposed design minimizes encroachment upon the steep slope critical areas by pushing the footprint of the parking lot as far south away from Coal Creek and the steep slope, as possible. The financial cost of restoring this site to existing conditions (which will have to occur if this site is not developed) is a financial impact which cannot be ignored. Furthermore, it makes sense to take advantage of the existing access to Coal Creek Park at this location. The proposed site has already been disturbed, so in this alternative, we are not creating any new disturbance by developing this site. With regards to stormwater management, we are avoiding the infiltration of any stormwater which might undermine the nearby steep slopes by tying into the existing stormwater infrastructure leading to Coal Creek. From an environmental and geological standpoint, the proposed restoration plantings and new detention pond will add wildlife habitat, and the plantings will help to stabilize the soils near the steep slopes adjacent to the site. Lastly, Coal seam #4 is located at the Red Town Trailhead across the road, increasing the Coal Mine Hazard Risk associated with developing at this location, which makes avoiding further development at the Red Town Trailhead location the preferable option.

Summary of How the Proposal Meets Each of the Decision Criteria Contained in Land Use Code Section 20.30P.:

A. The proposal obtains all other permits required by the Land Use Code

We will be applying for a Land Use in Critical Areas Permit and a Clearing and Grading Permit.

B. The proposal utilizes to the maximum extent possible the best available construction, design and development techniques which result in the least impact on the critical area and critical area buffer.

The creation of a stormwater detention pond at the west end of the site, and creation of bioswales or filter strips to intercept and treat runoff from the east portion of the proposed parking would reduce impact to the critical areas adjacent to the site. The proposed stormwater detention system would capture and treat much of the runoff which would otherwise sheet flow downhill toward the steep slopes adjacent to the site, risking undermining, destabilizing or eroding the steep slope. The native restoration plantings would further mitigate for the development by improving the ecosystem of the site, creating bird nesting habitat, and helping to stabilize the soils adjacent to the steep slope critical areas.

C. The proposal incorporates the performance standards of Part 20.25H LUC to the maximum extent applicable.

New or expanded City and public parks:

Geologic Hazard Areas – Steep Slopes - 20.25H.055.C.3.g – The design minimizes impacts to the adjacent steep slopes by preventing runoff from moving north toward the steep slopes adjacent to the site, and sending the runoff via a pipe to a newly created detention pond (formerly a natural depression in the land) to the west of the site, where it will be naturally infiltrated into the soils. The planting restoration will enhance the site's environmental and habitat functions, and the parking added will enhance the social function of the park as a public amenity. The design removes just two significant trees, and reverses the existing disturbance of native vegetation via restoration plantings. The trail width shall be minimized in order to limit disturbance to the surrounding environment. This proposed construction will conform to all applicable City of Bellevue codes and shall be consistent with the City of Bellevue's "Environmental Best Management Practices." No overall aquatic area flow peaks, duration or volume or flood storage capacity, or hydroperiod shall be significantly impacted by the design. Lastly, all disturbed area will be mitigated pursuant to a mitigation and restoration plan which includes removal of invasive plant species, and planting in any places disturbed by bringing by construction.

Geologic Hazard Areas – Steep Slopes - 20.25H.125 – The proposed trail leading from the parking area minimizes excavation and conforms to the existing topography. Its narrow footprint will minimize as much as possible any disturbance to the natural landforms and vegetation within which it will sit.

Geologic Hazard Areas - Coal Mine Hazard Areas – 20.25H.130 – A geotechnical engineering firm, Kane Environmental, was hired to conduct a surface reconnaissance and submit at application a report identifying any public safety mine hazards, coal mine waste dumps, or evidence of mine subsidence. The geotechnical report lists site specific

evaluation of potential for sinkhole development, and suggests recommendations for mitigation to comply with 20.25H.130. The report indicates that the site sits above a third level gangway of the No. 3 Seam located 570 feet below the surface. The report also found that the site contains no observed opening, sinkholes, shafts, or other mine-related features, and that it is likely that the third level gangway is fully collapsed. Furthermore, Kane determined that it is unlikely that other undocumented mine workings are underlying the site, and that the site seems suitable for development as a trailhead without additional mitigation measures.

Habitat Associated with Species of Local Importance - 20.25H.150 – A previously prepared report, the FEIS completed for the Coal Creek Stabilization Project, is included with this permit submittal in lieu of the Habitat Assessment. The report has been edited to include only information relevant to this project. If necessary, we will elaborate on this report when we submit for the Clear and Grade in Critical Areas Permit. In addition, the project will comply with the wildlife management plan prepared by the Department of Fish and Wildlife for any species impacted by the project.

New or expanded utility facilities, utility systems, stormwater facilities:

Geologic Hazard Areas – Steep Slopes - 20.25H.055.C.2 – The proposal has considered the existing infrastructure (the existing quarry spall / gravel pad on which the asphalt will be laid, and the existing stormwater detention ponds and outflows). The proposal aims to create the least disturbance possible to still achieve the goal of providing parking for the trailhead. The proposal acknowledges the inherent conflict between achieving the goal of a trailhead at this location and avoiding development within the steep slope critical areas buffer. However, the cost of disturbance on this site is actually lower than the cost of no disturbance on this site, since the proposed site actually improves environmental function of the site by reducing impervious area, and adding habitat function via planting restoration. Disturbance within the critical area buffer has been kept to the absolute minimum necessary to achieve the goals of the design. All work will be consistent with Applicable City of Bellevue Codes and Standards. The facility shall not adversely impact overall aquatic area flow peaks, duration or volume of flood storage capacity, or hydroperiod. Location of parking in this area has been located as far from the steep slope critical areas as possible, since no feasible alternative to this location exists (while we acknowledge that the critical area buffer is still encroached upon). The migation and restoration plan shall meet the requirements of LUC 20.25H.210.

Geologic Hazard Areas - Steep Slopes – 20.25H.125 – The proposed parking lot and stormwater treatment pond minimizes alterations to the natural contour of the slope as much as a parking lot and detention pond can. No significant grading beyond that which provides the intended function of the parking lot and stormwater treatment pond is proposed.

Geologic Hazard Areas - Coal Mine Hazard Areas – 20.25H.130 – A geotechnical engineering firm, Kane Environmental, has been hired to conduct a surface reconnaissance and submit at application a report identifying any public safety mine hazards, coal mine waste dumps, or evidence of mine subsidence. The geotechnical report will also list site specific evaluation of potential for sinkhole development, and will suggest recommendations for mitigation to comply with 20.25H.130. The report indicates that the site sits above a third level gangway of the No. 3 Seam located 570 feet below the surface. The report also found that the site contains no observed opening, sinkholes, shafts, or other mine-related features, and that it is likely that the third level gangway is fully collapsed. Furthermore, Kane determined that it is unlikely that other undocumented mine workings are underlying the site, and that the site seems suitable for development as a trailhead without additional mitigation measures.

Habitat Associated with Species of Local Importance - 20.25H.150 – A previously prepared report, the FEIS completed for the Coal Creek Stabilization Project, is included with this permit submittal in lieu of the Habitat Assessment. The report has been edited to include only information relevant to this project. If necessary, we will elaborate on this report when we submit for the Clear and Grade in Critical Areas Permit. In addition, the project will comply with the wildlife management plan prepared by the Department of Fish and Wildlife for any species impacted by the project.

D. The proposal will be served by adequate public facilities including streets, fire protection, and utilities

The proposed design is served by Newcastle Golf Club Road, which provides vehicular access to the site.

E. The proposal includes a mitigation or restoration plan consistent with the requirements of LUC 20.25H.210; except that a proposal to modify or remove vegetation pursuant to an approved Vegetation Management Plan under LUC 20.25H.055.C.3.i shall not require a mitigation or restoration plan

The proposal will remove all onsite invasive plant species, mainly Himalayan blackberry. In addition, approximately 12,000 square feet of restoration plantings are proposed in places disturbed by excavation as well as areas which are currently unplanted, and consist of bare soil covered in straw.

F. The proposal complies with other applicable requirements of this code. (Ord. 5683, 6-26-06, § 27)

Summary of How the Proposal Meets Each of the Criteria and Performance Standards Contained in Land Use Code Section 20.25H Associated with the Critical Area You Are Modifying:

New or expanded City and public parks:

Geologic Hazard Areas – Steep Slopes - 20.25H.055.C.3.g – The design minimizes impacts to the adjacent steep slopes by avoiding infiltration which could undermine the steep slopes and cause erosion or slides. Instead it detains and reroutes parking lot runoff down the slope via an existing stormwater drainage pipe just northeast of the site. The planting restoration will enhance the site's environmental and habitat functions, and the parking added will enhance the social function of the park as a public amenity. The design removes only two significant trees, and reverses the existing disturbance of native vegetation via restoration plantings. The trail width shall be minimized in order to limit disturbance to the surrounding environment. This proposed construction will conform to all applicable City of Bellevue codes and shall be consistent with the City of Bellevue's "Environmental Best Management Practices." No overall aquatic area flow peaks, duration or volume or flood storage capacity, or hydroperiod shall be significantly impacted by the design. Lastly, all disturbed area will be mitigated pursuant to a mitigation and restoration plan which includes removal of invasive plant species, and planting in any places disturbed by construction.

Geologic Hazard Areas – Steep Slopes – 20.25H.125 – The short proposed trail alignment which meets and matches the existing trail/roadway down to Coal Creek minimizes excavation and conforms to the existing topography. Its narrow footprint will minimize as much as possible any disturbance to the natural landforms and vegetation within which it will sit. The proposed parking lot and stormwater treatment pond minimizes alterations to the natural contour of the slope as much as a parking lot and detention pond can. No significant grading beyond that which provides the intended function of the parking lot and stormwater treatment pond is proposed.

Geologic Hazard Areas - Coal Mine Hazard Areas – 20.25H.130 - A geotechnical engineering firm, Kane Environmental, has been hired to conduct a surface reconnaissance and submit at application a report identifying any public safety mine hazards, coal mine waste dumps, or evidence of mine subsidence. The geotechnical report will also list site specific evaluation of potential for sinkhole development, and will suggest recommendations for mitigation to comply with 20.25H.130. The report indicates that the site sits above a third level gangway of the No. 3 Seam located 570 feet below the surface. The report also found that the site contains no observed opening, sinkholes, shafts, or other mine-related features, and that it is likely that the third level gangway is fully collapsed. Furthermore, Kane determined that it is unlikely that other undocumented mine workings are underlying the site, and that the site seems suitable for development as a trailhead without additional mitigation measures.

Habitat Associated with Species of Local Importance - 20.25H.150 – A previously prepared report, the Plants and Animals section of the FEIS completed for the Coal Creek Stabilization Project, is included with this permit submittal in lieu of the Habitat

Assessment. If necessary, we will elaborate on this when we submit for the Clear and Grade in Critical Areas Permit. In addition, the project will comply with the wildlife management plan prepared by the Department of Fish and Wildlife for any species impacted by the project.

New or expanded utility facilities, utility systems, stormwater facilities:

Geologic Hazard Areas – Steep Slopes - 20.25H.055.C.2 – This proposed project will conform to all applicable City of Bellevue codes, removal of only two significant trees is proposed, and restoration plantings are proposed to mitigate for disturbance, including planting in any places disturbed by grading, clearing and grubbing, or staging of construction materials.

Geologic Hazard Areas – Steep Slopes – 20.25H.125 - The proposed parking lot and stormwater detention pond minimizes alterations to the natural contour of the slope as much as a parking lot and detention pond can. No significant grading beyond that which provides the intended function of the parking lot and stormwater detention pond is proposed. The site on which the parking lot is to be located is already quite flat and in the direction desired for the function of directing runoff to the proposed stormwater detention pond, so grading will be minimized.

Geologic Hazard Areas - Coal Mine Hazard Areas – 20.25H.130 - A geotechnical engineering firm, Kane Environmental, has been hired to conduct a surface reconnaissance and submit at application a report identifying any public safety mine hazards, coal mine waste dumps, or evidence of mine subsidence. The geotechnical report will also list site specific evaluation of potential for sinkhole development, and will suggest recommendations for mitigation to comply with 20.25H.130. The report indicates that the site sits above a third level gangway of the No. 3 Seam located 570 feet below the surface. The report also found that the site contains no observed opening, sinkholes, shafts, or other mine-related features, and that it is likely that the third level gangway is fully collapsed. Furthermore, Kane determined that it is unlikely that other undocumented mine workings are underlying the site, and that the site seems suitable for development as a trailhead without additional mitigation measures.

Habitat Associated with Species of Local Importance - 20.25H.150 – A previously prepared report, the FEIS completed for the Coal Creek Stabilization Project, is included with this permit submittal in lieu of the Habitat Assessment. The report has been edited to include only information relevant to this project. If necessary, we will elaborate on this report when we submit for the Clear and Grade in Critical Areas Permit. In addition, the project will comply with the wildlife management plan prepared by the Department of Fish and Wildlife for any species impacted by the project.

Summary of How the Proposal Meets Each of the Criteria Contained in Land Use Code Section 20.25H.230 as required for applications proposing a Modification Through the Use of the Critical Areas Report Process:

This proposal is not proposing a modification through the use of the Critical Areas Report Process.

Coal Creek - Newcastle Trailhead

Critical Areas Land Use Permit:

Habitat Assessment

(Modified from an Environmental Impact Statement for the Coal Creek Stabilization Program, done by TetraTech/KCM, June 2006)

BARKER
LANDSCAPE
ARCHITECTS, P.S.

Prepared by
Barker Landscape Architects
October 14, 2010

This habitat assessment addresses the potential effects of the proposed alternatives on the wildlife habitat and species of Coal Creek. The "affected environment" section identifies the habitat types and wildlife species in the project area that could be affected by the alternatives. The Existing Conditions Report, found in Technical Appendix A, provides additional information on plants and animals in Coal Creek. This section is subdivided into upland habitats (west-side lowland forests, urban habitats, and west-side riparian wetlands) and riparian and aquatic habitats. Data on species present in the project area were derived from the *City of Bellevue Wildlife Inventory* (2003a). Special status species in the project area include endangered, threatened, proposed, candidate, sensitive and monitor species, and species of local importance. Information on Washington Department of Fish and Wildlife Priority Habitats and Species (PHS) and designated buffers present in the project area is also included.

AFFECTED ENVIRONMENT

Upland Habitat and Sensitive Species

Wildlife species require adequate forage, water, structure and space for breeding, nesting, roosting, and protection from predation (Johnson and O'Neil, 2001; Link, 1999). Habitat types in Coal Creek are regionally significant, as most of the upper and middle basin is within public parkland or protected by conservation easements. The Coal Creek riparian corridor is increasingly important to wildlife in the area as the surrounding uplands become urbanized. The City of Bellevue has identified the Coal Creek Basin as a wildlife habitat core area, meaning it is larger than 10 acres and has native forest, riparian, wetland, and other native habitat types. Though the Lower Reach of Coal Creek has narrowed and degraded riparian habitat, it provides important linkage between Lake Washington and Cougar Mountain for birds, mammals, and fish.

The landscape of the Puget Sound region prior to development consisted of mature forests dominated by large, multi-storied conifers and hardwood trees. Diverse riparian zones and wetlands were interspersed

throughout the forests, creating a complex mosaic of habitat types that provided breeding and foraging areas for native wildlife. Variable topography including steep slopes and ravines further added to the diversity of habitats available (City of Bellevue, 2003a).

Virtually all of the forest in Bellevue has been harvested at least once, and many of the wetland complexes have been drained, filled in, and permanently converted to grassland and other open habitats. Subsequently, residential and commercial development has consumed most of the regional landscape, and the dominant habitat type in the area is medium-density urban, primarily consisting of single-family residences (City of Bellevue, 2003a). The prevalent habitat types found in the Coal Creek Basin are "Westside Lowland Conifer-Hardwood Forest," and "Westside Riparian-Wetlands." Urban development in the Coal Creek basin is most prevalent in the upland areas and downstream of I-405. Upstream of the I-405 corridor, most of the Coal Creek basin is within public parkland. Common wildlife species for these habitats in the Coal Creek basin are listed in Table 6-1.

TABLE 6-1.
COMMON WILDLIFE SPECIES PRESENT IN COAL CREEK BASIN HABITATS
Birds Mammals Amphibians and Reptiles

Urban Habitat
American crow
Stellar's jay
American robin
Seagull species
European starling
House sparrow
Violet-green swallow
Virginia opossum
Raccoon
Several small mammal species

Westside Lowland Conifer-Hardwood Forest
Black-capped Chickadee
Dark-eyed Junco
Song Sparrow
Golden-crowned Kinglet
American Robin
Northern Flicker
Pileated Woodpecker
Red-breasted Nuthatch
Spotted Towhee
Bushtit
Raccoon
Opossum
Black-tailed deer
Coyote
Mole
Vole
Rat
Mouse
European Rabbit (non-native)
Eastern Gray Squirrel (non-native)
Pacific Tree frog

Red-Legged Frog
Northwestern Salamander
Long-toed Salamander
Western Red-backed Salamander
Rubber Boa
Northwestern Garter Snake
Common Garter Snake
Black Bear

West-Side Riparian Wetlands
Swallow
Belted Kingfishers
Warbler
Oriole
Woodpecker
European Starling
Heron
Duck
Finch
Grouse
Willow Flycatcher
Owl
Wren
Beaver
Mouse
Vole
Mink
Nutria
Shrew
Raccoon
River Otter
Bat
Bull Frog
Garter snake
Long-toed Salamander
Northern Red-legged Frog
Northwestern Salamander
Pacific Chorus Frog
Pacific Giant Salamander
Rough-Skinned Newt
Western Pond Turtle
Western Toad
Source: City of Bellevue, 2003a and DEA, 2001, Johnson and O'Neil, 2001)

Westside Lowland Conifer-Hardwood Forest

Westside lowland conifer-hardwood forest is prevalent in the upland areas of the Coal Creek Natural Area upstream of I-405. The forest structure primarily consists of medium-sized trees (5 to 7 inches diameter at breast height) that form a single canopy with moderate closure (40 to 70 percent). Dominant tree species in this type of habitat include Douglas fir, western hemlock, western red cedar, big leaf maple, red alder, and vine maple, though hardwood species tend to dominate in the Coal Creek Basin. Common understory vegetation includes salmonberry, Indian plum, sword fern, salal, and Oregon grape. Habitat elements or features include snags, downed logs, stumps, moss and lichens, leaf litter, and dense shrub thickets.

Invasive, non-native plants in the area include Himalayan blackberry, English ivy, and English holly, though they generally are only found in areas of disturbance, such as along roadways (City of Bellevue, 2003).

Many wildlife species have disappeared or become extremely rare in the west-side lowland forests of urban areas due to habitat fragmentation and young forest structure. Mammals that require large home ranges include black bear, cougar, and bobcat. Old growth forest species include spotted owl and marbled murrelet (Ferguson et al., 2001). Though the Cougar Mountain Regional Wildland Park and Coal Creek Natural Area complex is directly connected to the vast forests of Squak Mountain State Park and the Mountains to Sound Greenway, these species are not likely common in the Coal Creek Basin. However, a black bear was sited in the project area in the summer of 2005.

Urban Habitats

Features common to urban habitats include low canopy density, extensive impervious surface, young vegetation of highly-varied, non-native species, and unvegetated rights-of-way for infrastructure such as sewer lines and roads. Two significant roads are present in the Coal Creek basin: I-405 and Coal Creek Parkway. Road systems influence wildlife species distribution because they can create barriers to wildlife movement, fragment habitat, and facilitate the spread of non-native plant and animal species (Ferguson et al., 2001). However, mowed right-of-ways do not inhibit all wildlife species; they provide foraging habitat for red-tailed hawks, American kestrel, killdeer, Brewer's blackbird, rufous hummingbird, moles, and coyotes that require open habitats for hunting (WSDOT 2003). Other urban development impacts on wildlife include loss of food sources, local climate changes, light and noise disturbance, predation by domesticated pets, and the introduction of non-native or nuisance species (Johnson and O'Neil, 2001).

Urban development and associated landscaping provide habitat for plant species adapted to degraded and disturbed conditions. These "generalist" species have non-specific needs for habitat and can tolerate harsh conditions. Two such plant species are tansy ragwort and purple loosestrife. Tansy ragwort (considered a noxious weed) has been identified near I-405, Coal Creek Parkway, and just downstream of Lakemont Boulevard. Purple loosestrife is found in the I-405 corridor (King County, 2005a).

Westside Riparian-Wetland Habitat

Westside riparian-wetland habitat is sparse in the Coal Creek Basin. Small riparian and hydrologically isolated wetlands are present mostly in the Middle and Upper Reaches in the vicinity of minor tributaries to Coal Creek. The riparian wetlands, ranging in size from 0.3 to 1.3 acres (up to 5 acres for manmade wetlands), are mostly forested/scrub-shrub habitat associated with drainage swales or tributaries. This type of wetland is present where overflow occurs in the narrow floodplain of Coal Creek near the Bellevue city limits. The tree canopy in these wetlands is typically dominated by red alder, black cottonwood, and the occasional western red cedar. Willow and red-osier dogwood, often interspersed with Himalayan blackberry, dominate the underlying scrub-shrub communities in the forested wetlands (City of Bellevue, 2003b). Hydrologically isolated wetlands in the Coal Creek Basin are present exclusively in the headwater reaches beyond the scope of this study (City of Bellevue 2003b). There is one palustrine wetland (e.g., marshes, bogs, or floodplains that lack flowing water) located approximately 450 feet north of Coal Creek, halfway between the two proposed bed grade control structures east of RM 3.

The smaller wetlands in the Coal Creek Basin are affected by urban development, altered hydrologic cycles due to large areas of impervious surfaces, and encroachment of non-native invasive species. While this basin has a relatively small percentage of impervious surface, the level of development in the basin has likely altered the flora, fauna, and hydrologic characteristics of its wetlands. Wetlands in this basin are particularly vulnerable to non-native species invasion because they are small and easily overtaken by

aggressive plant species. Himalayan blackberry was the predominant non-native invasive species observed in the small riparian wetlands along Coal Creek. The Upper Reach of Coal Creek (within Bellevue city limits) contains mostly native forest habitat, and invasive species encroachment is relatively minimal (City of Bellevue, 2003c).

Birds use mature trees extensively for breeding and nesting; 150 wildlife species in Western Washington forests use dead and down woody materials in riparian floodplains for cover, shelter, foraging, reproducing, and resting. Small logs provide escape cover and shelter for small mammals, amphibians, and reptiles (increased log volume corresponds to increased densities of some species); large diameter logs, especially hollow logs, are used for dens, resting, and litter-rearing sites for larger vertebrates (e.g., marten, bobcat, black bear); high densities of large logs or upturned stumps provide security cover for lynx and foraging habitat for mink, marten, and cougar. Snags and downed wood are also used by cavity nesting birds (e.g., woodpeckers and sapsuckers) for nesting, foraging on insects, and roosting. Riparian vegetation in the Upper Reach of Coal Creek where these structures would be placed is characterized by mature trees offering a moderate degree of shade. Sensitive wildlife species that rely on large trees and snags (e.g., pileated woodpecker Vaux's swift, and merlin) could be impacted by the removal of individual trees if they contain nests.

Wildlife species abundance and diversity are higher in wetland-riparian areas than in other habitat types because these areas generally provide greater structural and plant diversity, more edge habitat, more varied forage and a predictable water source (Kauffman et al., 2001 in Johnson and O'Neil, 2001).

Sensitive and Protected Species

The Coal Creek Basin is considerably more intact in the Middle and Upper Reaches than most other urban basins in the region and has the potential to support special status species designated by federal or state agencies. Special status includes endangered, threatened, proposed, candidate, sensitive and monitor species, and species of local importance (in King County).

Up to 22 special status wildlife species may exist in the City of Bellevue. Nine of these are breeders or resident species in Bellevue—red-tailed hawk, purple martin, osprey, Vaux's swift, green heron, pileated woodpecker, great blue heron, bald eagle, and merlin (City of Bellevue 2003a)—and could occur in the Coal Creek basin. The remaining 13 species are migrants, are rare, or have likely been extirpated from the area. The range for these species includes the greater Lake Washington area and it is unlikely, though possible, that these species exist in the Coal Creek Basin. A list of special status species potentially supported by habitat found in the City of Bellevue and the Coal Creek Basin can be found in Table 6-2.

The Washington Department of Fish and Wildlife (WDFW 2003b) publishes a list of priority habitats and species, which identifies habitats and species considered to be priorities for conservation and management. Priority habitats include habitat types or elements with unique or significant value to a diverse assemblage of species, such as a unique vegetation type or dominant plant species, a described successional stage, or a specific structural element (e.g., nest). The riparian buffer around Coal Creek is designated as a priority habitat by the WDFW. This is the only riparian area that would be impacted by project activities. The Upper Reach of Coal Creek runs though the Cougar Mountain Wildland Park.

Two bald eagle territories are located in the vicinity of the project area. The Southeast Mercer Island Bald Eagle Territory, a productive site in 1996, is approximately a quarter-mile (at the closest point) to half-mile south-southwest of the Lower Reach of Coal Creek along the shoreline of Lake Washington. The Chism Beach Bald Eagle Territory, also active in 1996, is approximately a quarter-mile north northeast of the mouth of Coal Creek outside of Chism Beach Park and encompasses part of Mercer Island and the Beaux Arts area.

TABLE 6-2.

SPECIAL STATUS SPECIES

Species	Fed./State Status	Preferred habitat (a.)	Occurrence in Bellevue
Common Breeders and Resident Species			
Bald Eagle	T / T	Near mature trees and water bodies	
Pileated Woodpecker	ns / C	Large snags	Common
Vaux's Swift	ns / C	Open water, dead snags	Undocumented, but likely present
Purple Martin	ns / C	Large snags	Undocumented
Merlin	ns / C	Tree cavities	Undocumented
Great blue heron	ns / M	Wetlands and shorelines	Documented
Green heron	ns / M	Shorelines	Documented
Osprey	ns / M	Large trees or utility poles near open water	Documented
Red-tailed Hawk	ns / L	Mix of forest and open grassland	Documented
Migrants, Rare, or Extirpated Species			
Oregon spotted frog	C / E	Ponds, emergent wetlands	Rare
Peregrine falcon	ns / E	Lake shoreline, cliffs	Rare
Western pond turtle	ns / E	Ponds	Extirpated from area
Western grebe	ns / C	Riparian, lakes	Migrant
Western big-eared bat	SOC / C	Forests, caves, mines, abandoned buildings, bridges	Rare
Keens myotis	ns / C	Forests, tree cavities, cliff crevices	Rare
Long-eared myotis	ns / M	Forests and open water, caves	Documented
Western toad	ns / C	Wetlands, ponds	Extirpated from area
Common loon	ns / S	Large, forest lakes, coastline	Rare
Willow flycatcher	SOC / ns	Riparian, wetland, and forests	Rare
Olive-sided flycatcher	SOC / ns	Riparian, wetland, and forests	Rare
Red-legged frog	SOC / ns	Riparian, wetland, and forests	Rare
Yuma myotis	SOC / ns	Riparian, wetland, and forests	Rare

a. C = Candidate, E = Endangered, L = Local Importance, M = Monitored, ns = No status information, S = Sensitive, T = Threatened, SOC = Species of Concern.

Source: City of Bellevue Wildlife Inventory, 2003a

In 2006, Two bald eagle nests were documented in the Coal Creek Basin. One nest was built in 2004 and produced two chicks in 2006, the other was built in 2006. A peregrine falcon nest site, documented in 2004, is located on the east channel of the I-90 bridge, just over a halfmile northwest of the mouth of Coal Creek. WDFW considers heron rookeries and large concentrations of breeding or communally roosting bats to be priority habitat areas that could occur in the project area but have not been documented.

Riparian and Aquatic Habitat and Sensitive Species

Riparian and aquatic habitat conditions in the Coal Creek Basin are highly variable and support modest fish use. The moderate gradient of the Lower and Middle Reaches and abundant gravels make Coal Creek a potentially productive salmon stream. However, high sediment loading reduces this potential considerably by reducing pool depth, embedding suitable spawning gravels, and covering existing redds. Salmon production is also limited by the lack of large woody debris, occasional high water temperatures, scour flows, and lack of off-channel habitat. Despite these limitations, Coal Creek was found to have better habitat conditions than other urban streams in the area, likely because it has the highest amount of undisturbed riparian corridors as part of an extensive system of parks and open spaces (Kerwin 2001).

The City of Bellevue regulates sensitive areas, such as stream corridors, through its Natural Determinants Ordinance. The Natural Determinants Ordinance has identified all reaches of Coal Creek in the project area as Type A Waters. Type A Waters include riparian habitat with a vegetation community that is integrated with the stream ecosystem and provides food, shelter, breeding and rearing areas for aquatic and upland animals. In 2006, the City was in the process of updating the ordinances governing protection measures for Type A Waters with a new Critical Areas Ordinance to ensure compliance with the Washington Growth Management Act.

Benthic Index of Biotic Integrity

Biological indicators reflect habitat conditions in an aquatic system as well as water quality conditions over a longer term than non-continuous water quality sampling. The varying tolerance levels of aquatic invertebrates to pollution or stress conditions can be used to determine the effect of human activities on habitat (Fore et al., 1996). The term “biotic integrity” refers to an ecosystem’s ability to support and maintain a balanced, integrated, adaptive assemblage of organisms, with species composition, diversity, and functional organization comparable to that of natural habitat in the region (Karr and Dudley, 1981; Karr et al., 1986). The benthic index of biotic integrity (BIBI) synthesizes several types of data into a single number depicting overall biological condition.

BIBI sampling was performed in 1998, 2001, and 2002. The 1998 assessment showed that the benthic community in Coal Creek was impaired in the Cinder Mine area and highly impaired downstream of Coal Creek Parkway. In 2001, benthic conditions had degraded to a highly impaired condition in the Cinder Mine area and critically impaired downstream of Coal Creek Parkway. The drop in BIBI scores at the Cinder Mine area were due to a drop in “clingers,” which occupy the spaces between rock and cobble along the bottom and are particularly sensitive to fine sediment deposition (King County, 2005c). The drop in BIBI rating at the Cinder Mine Area appears to have affected BIBI scores downstream. Scores at the Cinder Mine Area are improving slightly, but other BIBI scores have not responded at this time. BIBI sampling is described in Technical Appendix A.

Habitat Conditions in Coal Creek Basin

Habitat conditions were recently evaluated for the update to Bellevue's Critical Areas Ordinance, using a modified version of the Urban Stream Baseline Evaluation Method (USBEM; R2 Resource Consultants, 2000). The USBEM is used to establish a baseline habitat condition for salmon in urban or urbanizing areas. This method analyzes biological, physical, and water quality factors to classify streams into highly suitable habitat use, secondary habitat use, or negligible habitat use (R2 Resource Consultants, 2000). Considerations for a healthy system include water quality, habitat access, in-stream elements (such as LWD and pools), channel conditions and dynamics, hydrology, watershed conditions, and riparian conditions.

The USBEM evaluation classified Coal Creek as secondary habitat use for all salmonids due to a combination of channel types and watershed alteration. Current salmonid use includes chinook, coho, sockeye, and steelhead up to RM 2.5. Coho have also been observed in the Newport Hills Tributary. The distribution of fish species in Coal Creek is based on limited data, and may not reflect the entire distribution of juvenile fish species throughout the system. Cutthroat trout are present throughout the basin in all ephemeral reaches. Year-round flow occurs in the main stem of Coal Creek to just downstream of Lakemont Boulevard. The overall watershed alteration is moderate, with a good rating for length of stream enclosed in pipes and moderate levels of total impervious area within 100 feet of the stream (City of Bellevue, 2003c).

The moderate gradient of the Lower and Middle Reaches and abundant gravels make Coal Creek a potentially productive salmon stream. However, high sediment loading reduces this potential considerably by reducing pool depth, embedding suitable spawning gravels, and covering existing redds. Salmon production may be limited by the lack of large woody debris, occasional high water temperatures, scour flows, and lack of off-channel habitat. Despite these limitations, Coal Creek was found to have better habitat conditions than other urban streams in the area, likely because it has the highest amount of undisturbed riparian corridors as part of an extensive system of parks and open spaces. The habitat condition in each reach of Coal Creek is discussed in the following sections. Included in the discussion are the results of a preliminary habitat assessment performed at each of the program element sites. A complete assessment of the habitat condition will be performed during the design phase of each element.

Lower Reach—Lake Washington to I-405

The lowest reach of Coal Creek extends from the mouth at Lake Washington to the I-405 corridor. The culvert under Cascade Key has been identified as a partial fish passage barrier (WDFW, 2005b). The Lower Reach of Coal Creek has been greatly altered in the past century and currently provides minimal habitat for fish. The stream channel has been relocated numerous times, straightened, and armored with riprap. The riparian corridor is now totally encroached upon by residential landscaping (Buchanan 2003). LWD is largely absent, as are pools and clean, well-sorted substrate. As of 2006, LWD levels were low, and the resulting reduction in natural sediment storage provided by wood could contribute to higher in-stream sediment conditions. May (1996) estimated that the Coal Creek's substrate contained greater than 50 percent fines in the reach downstream of I-405 (City of Bellevue 2003). Riparian vegetation in this reach is mostly composed of grass, brush, and landscaping trees (Spearman 1997), which provide poor LWD recruitment potential, shade, or in-stream refuge.

Middle Reach—I-405 to Coal Creek Parkway

The Middle Reach of Coal Creek extends from I-405 to Coal Creek Parkway. The creek flows through the Coal Creek Natural Area except for a 2,000-foot segment near 125th Avenue SE. The creek is confined within a steep-walled valley that ranges from 200 to 300 feet wide near I-405 and gradually narrows to about 100 feet wide upstream at Coal Creek Parkway. The creek has a natural channel throughout this reach except in a few locations where riprap was placed to protect eroding streambanks.

As of 2006, the riparian condition in this reach was generally good, with 60 to 80 percent canopy coverage. Deciduous trees and shrubs dominate the riparian environment, though a few conifers are found, mainly on the steeper slopes of the valley. The dense riparian zone of medium-sized trees provides moderate recruitment potential for LWD (R2 Resource Consultants, 2000).

Channel substrate in the Middle Reach ranges from sand to cobble (CH2M Hill, 2001). May (1996) estimated that the substrate in the Middle and Upper Reaches of Coal Creek was at least 25 percent fines. Embedded substrate is not universal in Coal Creek, and several places in the Middle Reach provide good potential spawning habitat. Woody debris in the Middle Reach of Coal Creek consists primarily of large deciduous trees (City of Bellevue, 2003c), with an average distribution of 1.8 pieces per channel width (Kerwin 2001). As of 2006, LWD levels were low, and the resulting reduction in natural sediment storage provided by wood could contribute to higher in-stream sediment conditions.

Though the quality and quantity of pools and other refugia in Coal Creek is poor in comparison to pristine streams, the in-stream structure is uncharacteristically complex compared to other urban streams. There are numerous LWD complexes, some pools in excess of 2 feet deep (created by weirs), a couple of channel braids, and limited access to the floodplain in places (Buchanan, 2003).

The culvert under I-405 has been identified as a partial barrier to fish passage (City of Bellevue, 2003c). The I-405 culvert is approximately 475 feet long and 6 by 8 feet in cross-section, with offset baffles along its base to aid upstream fish passage. Three log/riprap weirs at the outlet of the culvert facilitate fish passage and provide a small amount of pool habitat for fish. As part of the I-405 Congestion Relief and Bus Rapid Transit project that, in 2006, was in the planning stages, the Washington State Department of Transportation (WSDOT) was proposing to replace this culvert with an open span bridge and daylight Coal Creek under I-405 to improve channel habitat and fish passage (WSDOT, 2006).

Just upstream of the I-405 culvert is the I-405/Coal Creek Detention/Sedimentation facility. In this area, the stream-type habitat has been converted to a pond-type habitat with no available spawning substrate and minimal rearing habitat. The banks are armored with riprap and the riparian area is sparsely vegetated (Buchanan 2003). Conditions at this site may provide decreases in turbidity downstream. Because of reduced flow velocity in the pond, it may also provide refuge for fish during high flows. Limited monitoring of substrate characteristics below the I-405 facility (Johnson, et al. 1997 and 1999, Johnson and Menconi, 2000) did not characterize water quality conditions at the facility. LWD transport may be impeded by the existing facility, as wood had to be removed from the concrete structure at the downstream end following very extreme flow events in the 1990s (S. Taylor, 16 May 2006, Personal communication). Sediment conditions and transport in the reach downstream of the facility was more affected by the location of LWD than by other factors. LWD provides natural storage of sediment in stream systems (Johnson and Menconi, 2000).

Immediately upstream of the existing I-405 facility, substrate is mostly cobble that is deeply embedded (greater than 40 percent). As of 2006, there were no natural woody debris features in the stream, although juvenile salmonids were observed project staff in August 2005 in this reach. The riparian vegetation is mostly young alder with sparse large cottonwood trees that offer moderate shade and LWD recruitment potential. Though pools are abundant, they are mostly of poor quality as there is little to no cover. No off-channel habitat was observed.

Upper Reach—Coal Creek Parkway to Lakemont Boulevard

The creek has a natural channel section in this reach but is moderately entrenched in some locations. The creek valley narrows in this reach, ranging from the width of the channel to about 100 feet. As of 2006,

despite the influence of urban development in the region, conditions in the Upper Reach of Coal Creek were relatively good, with abundant large woody debris, suitable pool habitat (CH2M Hill 2001) and dense riparian vegetation. This reach is entirely within the boundaries of Coal Creek Regional Park and Cougar Mountain Park Regional Wildland Park. Riparian cover in the reach consists of dense mature maples, alder and mixed conifers roughly 30 to 50 years old. The riparian zone ranges from 30 to several hundred feet wide (CH2M Hill, 2001). As of 2006, LWD levels are low, and the resulting reduction in natural sediment storage provided by wood could contribute to higher in-stream sediment conditions.

The gradient in this reach is considerably higher, with steep canyons, large boulders, and exposed bedrock chutes. Upstream of the canyon, the channel widens and the gradient flattens. In this section, gravel is generally suitable for spawning habitat. Remnant chunks of coal from historical coal mining are a significant component of the streambed through this section. Few species of salmon consider the higher gradient reaches of the Upper Reach of Coal Creek suitable habitat; mostly cutthroat have been found here (City of Bellevue, 2003c).

Substrate parts of the upper reach is relatively clean, well sorted cobble. As of 2006, LWD was present in the channel and the potential for future recruitment was moderate, as the riparian vegetation was primarily young alder with some mature trees present. Pools are abundant in this area though they are shallow and not considered high quality habitat. Presence of off-channel habitat during high water is likely, indicated by sediment deposition in adjacent riparian areas. As of 2006, overall, the in-stream and riparian habitats were highly complex and healthy. Abundant juvenile salmonids were noted during the survey.

As of 2006, substrate at other locations of the upper reach were varied. Near an existing sedimentation facility, water was slow and the cobble was embedded approximately 30 to 40 percent. Upstream, the substrate had good potential for spawning habitat at high flows (steelhead in the spring) but low-flow conditions left the cobble and gravel exposed. LWD was in the form of sparse large logs. The riparian community consists of small to medium-sized vine maple, alder, cottonwood, and cedar trees offering good potential for LWD recruitment. The pools in this area provide high quality rearing habitat for juveniles, which were abundant at the time of survey. Presence of off-channel habitat during high water is likely, indicated by sediment deposition in adjacent riparian areas.

Within a stretch of about 5,000 feet in the Upper Reach of Coal Creek, as of 2006, habitat conditions were generally uniform. Substrate was primarily cobble and was relatively clean and well-sorted. Moderate amounts of LWD were present in the channel, and recruitment potential was moderate. The riparian vegetation is dense forest with several large mature trees. Pool development and quality were indeterminable at the time of the survey, as no water was in the channel. The floodplain in this area is mostly disconnected due to excessive erosion, steep slopes, and deep channel incision. Evidence of off-channel habitats was not observed.

Delta

Research has shown that the Coal Creek delta may be causing detrimental impacts on fish. Densities of juvenile chinook salmon in the Coal Creek delta are lower than the average densities at other tributary deltas in Lake Washington. Fresh (2000) identifies that juvenile chinook use Lake Washington as important rearing and migration habitat. He also notes that creek mouths were found to be especially important habitat for these fish. Of the 15 sites with the highest fish density (as measured by catch per haul), nine were at creek mouths along the lake (Fresh 2000). Catch per unit effort at creek mouths sampled was more than three times that of other habitat. Tabor et al. (2004) found that juvenile Chinook density in delta areas of creek mouths along Lake Washington was, on average, twice that of reference sites in the lake. Deltas are identified as important juvenile chinook habitat due to their shallow depth, gentle slope, and sand substrate.

These data indicate the general importance of creek mouth habitat for juvenile chinook salmon in Lake Washington.

Tabor et al. (2004) did sample the mouth of Coal Creek. The delta area was measured to be 3,500 square meters in spring 2002, however, the chinook density in the Coal Creek Delta was lower than in other tributary deltas, and was also lower than the reference site in Lake Washington. The estimated density of Chinook at the Coal Creek delta is 0.03 fish per square meter. The average Chinook density for all tributaries sampled on Lake Washington was 0.20 fish per square meter (Tabor et al., 2004). These data, although not conclusive, suggest that there are limitations on the quality of the delta habitat associated with Coal Creek that could be due to high sediment levels. Although not supported by data, one resident provided anecdotal information about a sighting of an adult salmon (species unknown) having difficulty entering the mouth of Coal Creek during low flow conditions in late summer when the lake was drawn down (S. Taylor, 16 May 2006, personal communication).

Sensitive and Protected Species

Fish presence, abundance, and distribution in Coal Creek have been documented through spawner surveys, spot observations (King County Salmon Watcher Program 2000 & 2001, and Watershed Company 2001), and occasional juvenile electrofishing surveys (Johnson and Menconi 1997). Limited fish utilization surveys have been conducted in Coal Creek, but existing information indicates that adult salmonids (mostly coho) are returning in low numbers (Kerwin, 2001). Salmonid species observed in Coal Creek include the following:

• *Oncorhynchus tshawytscha*—Chinook salmon found in Coal Creek are part of the Puget Sound Evolutionarily Significant Unit (ESU) and are listed as "Threatened" under the Endangered Species Act by NOAA Fisheries. Washington Department of Fish and Wildlife (WDFW) has not determined which stock the Coal Creek Chinook are from, therefore the state designation of status is indeterminate. Chinook salmon use Coal Creek below RM 2.5, though documented sightings are sparse (City of Bellevue 2003c). Due to their size, most chinook salmon prefer to spawn in the main stem of river systems where the stream flow is high. Therefore, it is likely that chinook salmon use the main stem of Coal Creek for spawning and possibly smaller tributaries or off-channel habitats for rearing.

• *Oncorhynchus kisutch*—Coho salmon found in Coal Creek are part of the Puget Sound/Strait of Georgia ESU and are listed as a "Species of Concern" under the Endangered Species Act by NOAA Fisheries. WDFW has identified coho in Coal Creek as members of the Lake Washington/Sammamish stock, which is listed as "depressed." Coho salmon use Coal Creek below RM 2.5 (City of Bellevue 2003c, CH2M Hill, 2001; Kerwin 2001, (PSFMC, 2006). The Stream Catalogue (Williams, et. al., 1977) cites an impassable chute at RM 2.5 on Coal Creek that would prevent anadromous fish passage. Additionally, coho salmon have been observed spawning and rearing throughout the Newport Hills Tributary (WDFW, 2005b; Buchanan 2003).

• *Oncorhynchus nerka*—Sockeye salmon found in Coal Creek are part of the Baker River ESU and are not ESA-listed by NOAA Fisheries. WDFW has identified the sockeye in Coal Creek as members of the Lake Washington/Sammamish stock, which is listed as "healthy." Sockeye salmon use Coal Creek downstream of RM 2.5 (City of Bellevue 2003c, CH2M Hill, 2001, Kerwin 2001).

• *Oncorhynchus mykiss*—Winter steelhead found in Coal Creek are part of the Puget Sound

ESU. This ESU is not currently an ESA-listed species, however a petition for consideration is under review by NOAA Fisheries. WDFW has identified the steelhead in Coal Creek as members of the Lake Washington stock, which is listed as "critical." Steelhead have been observed upstream of Newcastle tributary (Buchanan 2003). Additionally, steelhead spawners were observed in Tributary 0273.

• *Oncorhynchus clarki clarki*—Cutthroat trout found in Coal Creek are part of the Puget Sound ESU and are not an ESA-listed species under NOAA Fisheries. WDFW has identified the cutthroat trout in Coal Creek as members of the South Puget Sound stock complex, the status of which is currently unknown. Cutthroat trout use both Coal Creek and the Newport Hills Tributary (King County, 2005b; CH2M Hill, 2001).
Figure 6-1 shows the salmonid distribution in Coal Creek.

General Salmon Life History

The life cycle of salmonids varies by species; however some general milestones are universal to all of them. Fertilized eggs incubate in a nest, or redd, that is dug into the streambed by the adult female. The eggs hatch and tiny alevins emerge, remaining in the gravel of the redd for protection.

Salmon fry remain in the freshwater for varying times (hours to years), depending on the species. To adapt to saltwater, anadromous salmonids undergo a process called smoltification. During smoltification, juveniles move into the estuary (where both salt and fresh water exist) to acclimate to saltwater conditions. Ocean-bound young salmon may spend days or months in estuaries and nearshore waters as they adjust to saltwater and grow, getting ready for migration to the Pacific Ocean.

After one to seven years in the ocean, anadromous salmonids return to their natal stream to spawn. Female adults select a site, dig redds with their tails, and deposit eggs that are then fertilized by one or more males. Most salmon species die within one week of spawning; however some, such as steelhead or sea-run cutthroat, may spawn several times. Decaying fish provide valuable nutrients for aquatic insects and riparian wildlife (Ecology, 2005).

Additional information on specific species life histories can be found in Groot and Margolis (1991).

IMPACTS AND MITIGATION COMMON TO ALL PROGRAM ELEMENTS

This section discusses impacts on plants and animals common to all program elements. Common impacts primarily relate to ground disturbance of upland and riparian forested areas and construction activity. Mitigation is also generally described in this section. The differing magnitudes of impacts for each element are quantified in the sections discussing project-specific impacts.

Upland Forest Habitat Disturbances

Removal of shrubs, grasses, trees or downed wood would reduce the quality and quantity of wildlife habitat available for nesting, breeding, brooding, foraging, resting, and migration. Indirectly, disturbance associated with staging areas in upland sites is conducive to invasion by exotic species that could alter the composition and structure of vegetation, and could increase erosion potential. Two invasive species have been documented in the vicinity of the project area. Tansy ragwort has been documented near I-405 and Coal Creek Parkway, and downstream of Lakemont Boulevard. Purple loosestrife has been documented in the I-405 corridor. Consequently, these species could be introduced to the project area..

Access to the proposed site would be through an existing access road/driveway. Any new permanent access roads or trail will be aligned to minimize disturbance to vegetation and to avoid mature trees to the greatest extent possible. To mitigate the loss of habitat due to the construction of the parking area, an equivalent area of existing poor quality habitat would be enhanced by planting native, diverse plant species. Any mature trees removed from the upland area would be placed in adjacent, undisturbed areas as downed trees. No trees would be removed during nesting season. Invasive non-native species would be removed twice a year during maintenance operations.

Mitigated impacts on upland habitat associated with disturbance and vegetation removal are temporary and considered insignificant.

Riparian Habitat Disturbances

No disturbance of riparian habitat is anticipated.

Construction Related Impacts

Construction routes would use Newcastle Golf Club Road, an existing permanent arterial road. Any new temporary access road or trails would be aligned to minimize disturbance to vegetation and to avoid mature trees. Low impact construction techniques, such as use of hand construction, low-pressure tracked equipment, and equipment platforms, would be used in sensitive areas. Downed trees would be stored and replaced following construction.

Construction would take place during agency-approved windows. Construction related impacts would be mitigated limiting construction activity to the dry season, and fully implementing erosion control BMPs as required by Bellevue City Code. Land cleared for construction activity would be fully restored with landscape planting of native vegetation; however, the volume of stormwater runoff may not return to existing levels until the establishment of mature vegetation.

PROPOSED PLAN IMPACTS AND MITIGATION

Asphalt Parking Lot w/Detention Pond and Pipe Drainage

The asphalt parking lot with detention pond and pipe drainage via catch basins will capture all new runoff from the replaced impervious surface in this design. The stormwater measures (catch basin, detention pond, and tie-into existing stormwater pipe) are expected to avoid erosion that runoff would cause, and will prevent destabilization of the adjacent steep slopes. The detention pond would be lined with material to prevent infiltration, and an overflow outfall will be installed, so infiltration that might undermine the nearby steep slope is not anticipated.

This program element also includes native plantings in all disturbed areas and some boulder retaining walls at the edge of the pond, which are anticipated to preserve soil and slope stability, and add potential habitat in previously disturbed areas.

Upland Habitat and Sensitive Species

Material for the asphalt parking lot would be delivered to site by truck via an existing access drive. Temporary disturbance of 5000 square feet of upland habitat is anticipated, including selective hand removal of invasive species, and some minor clearing and grading. Most of the disturbance to the site will occur in previously disturbed areas which are currently covered in quarry spalls and gravel, and thus are providing no habitat value currently. Removal of most significant trees would be avoided. General impacts on upland habitat and proposed mitigation activity are described in the earlier section in this chapter discussing impacts common to all program elements. Indirectly, ground disturbance associated with clearing and grading and staging areas is conducive to invasion by exotic species that could alter the composition and structure of vegetation, and could increase erosion potential. To mitigation this potential impact, disturbed areas would be regraded, reseeded, and replanted with native vegetation. Invasive type species would be cleared twice a year by mechanical and manual methods. Mitigated impacts associated with disturbance and vegetation removal are considered insignificant. The overall amount of habitat disturbed by the project is anticipated to be reduced in the long term, since some existing impervious surface of quarry spalls will be removed, invasive plants will be removed, and diverse native restoration plantings will be installed.

Riparian and Aquatic Habitat and Sensitive Species

No work is anticipated in Riparian and Aquatic Habitats, therefore no impact is ancicipated.

Construction related impacts on riparian and aquatic habitat and proposed mitigation are described in the earlier section in this chapter discussing impacts common to all program elements.

Species-Specific Effects

• Habitat used by sensitive species in riparian and aquatic habitats would not be affected, as the proposed parking lot with detention pond would not be located in areas of Coal Creek used by these species.

Summary of Impacts and Mitigation

Indirectly, ground disturbance associated with construction access roads and staging areas is conducive to invasion by exotic species that could alter the composition and structure of vegetation, and could increase erosion potential. To mitigation this potential impact, disturbed areas would be regraded, reseeded, and replanted with native vegetation. Invasive type species would be cleared twice a year by mechanical and manual methods. Mitigated impacts associated with disturbance and vegetation removal are considered insignificant.

Riparian and Aquatic Habitat and Sensitive Species

Riparian Function

No riparian area would be disturbed during the installation of the proposed design

Habitat Effects

No habitat effects are anticipated since no riparian area will be disturbed by the design.

Cumulative Impacts

During the mining era of the Coal Creek basin, an estimated 4 million cubic yards of mining waste were dumped either back into the mines or into the stream. Consequently, the composition of the streambanks and riparian hillslopes results in unstable soils that continue to erode to date. The excessive erosion and hillslope failure has significantly degraded riparian and aquatic habitat in Coal Creek. Previous efforts have stabilized large sections of unstable slopes and significantly improved erosion and sedimentation to Coal Creek, though sediment from these repaired sources may still be in transport and affecting water resource in Coal Creek.

In 2006, stabilization projects were underway in the Middle Reach of Coal Creek, and several stormwater outfall improvement projects, as of 2006 were planned for construction later that year, all of which would reduce turbidity and erosion in Coal Creek. Under one alternative, the proposed projects would stabilize approximately 1,700 feet of streambank in the Upper Reach and store up to 1,500 cubic yards of sediment per year at the Middle Reach sedimentation facility. By stabilizing the streambanks, these projects would promote healthy riparian forest succession and sustain vital land-water habitat linkages and riparian functions over the long term. In the short term, riparian function would be temporarily degraded due to removed vegetation during construction.

Though the exact impacts of future residential developments cannot be determined, it can be said that most of the habitat outside of the park boundaries is of poor to moderate quality due to fragmentation, deforestation, and changes in vegetation composition. If forest habitat is removed or altered that is adjacent to the Coal Creek Natural Area or the Cougar Mountain Regional Wildland Park, edge effects would likely occur. Common edge effects include drier conditions due to increased wind and sun exposure as well as increased presence of predators and parasites that may occur in adjacent developed areas. Both of these changes would likely alter vegetative and wildlife composition along the edge of the forest.

Current and future development projects in the Coal Creek basin will cause a net decrease in forested habitat throughout the basin, but the mature, intact forest habitat found within the Coal Creek Natural Area and Cougar Mountain Regional Wildland Park will remain in conservation. Therefore, collectively, this design and future unrelated development projects would not likely have significant adverse impacts on wildlife habitat or sensitive species.

Significant Unavoidable Adverse Impacts

Significant unavoidable adverse impacts on plants and animals because of construction of the proposed parking lot are not anticipated. Some unavoidable adverse impacts may occur during construction if mitigation measures are not consistently applied or maintained; however, the impacts are not anticipated to be significant because they would be temporary and would be contained as soon as detected.

No significant adverse impacts are expected on upland habitat.

NO-ACTION ALTERNATIVE IMPACTS

Under the No Action alternative, problems with soil erosion along steep slopes adjacent to the currently disturbed site and the subsequent sediment input to waterways could continue to contribute to degraded riparian and aquatic habitat. Although no vegetation would be removed or disturbed due to construction

activities, riparian habitat would likely be degraded due to continued erosion. By reducing the functionality of riparian habitats, many species that rely on habitat elements of riparian areas (e.g., LWD, mature trees) for foraging, roosting, nesting, and breeding and cover would be adversely impacted. In addition, the No Action Alternative would not result in the same benefits to wildlife as the proposed design, including increased habitat complexity from diverse native plantings and the proposed water quality pond which would likely attract some local species as a water source.

Restoration / Mitigation Plan
Per Bellevue LUC 20.25H.210 through 20.25H.225

BARKER
LANDSCAPE
ARCHITECTS, P.S.

Prepared by
Barker Landscape Architects
October 14, 2010

Environmental Goals and Objectives

This design seeks to avoid, minimize and mitigate for any environmental impacts to the nearby sleep slope and coal mine hazard critical areas, through a variety of strategies. By adhering to Bellevue's strategy of mitigation sequencing, the impact of this proposed development on the site can been kept to a minimum, and substantially mitigated through restoration planting.

The proposed design hopes to avoid significantly affecting the steep slope critical area buffer in which it lies, promote the restoration of environmental and habitat function and protect the site from soil erosion by way of restoration plantings and responsible stormwater management techniques.

Avoid, Minimize, Mitigate

The proposed design avoids the infiltration of stormwater to handle stormwater runoff, and proposes a stormwater system which will capture runoff from the proposed impervious survace, route it off the site and treat it in a detention area, and avoiding any infiltration which could undermine the steep slope adjacent to the site. The design removes only two significant trees. Because the footprint of the design lies almost entirely within the footprint of existing previously disturbed and cleared area, the design would avoid creating any significant new disturbance.

The proposed design minimizes impacts to the site in several ways. The width of the proposed trail leading from the parking lot has been minimized to avoid the disturbance to the surrounding area. The re-use of existing stormwater conveyance systems minimizes new material

use, and reuse of existing quarry spalls which have been previously laid down on site also minimizes economic cost of new materials.

The proposed design seeks to mitigate for any new disturbance caused by construction, and mitigates for existing disturbance through restoration plantings consisting of approximately 12,000 square feet of native plant species, including serviceberry, vine maple, beaked hazelnut, mock orange, sword fern, dull Oregon grape, evergreen huckleberry, salmonberry, Indian plum, salal and baldhip rose, which will enhance the environmental and habitat function of the site, as well as stabilize the site soils, preventing erosion (see Planting Plan, Sheet 6).

Measureable Criteria

We propose the following specific measureable criteria for evaluating whether or not the goals and objectives of this mitigation and restoration plan have been met:

Descriptions / Specifications of the Restoration / Mitigation Plan

1. Planting Restoration Plan – Drawing Sheet 6 describes the proposed planting / restoration plan

Measureable Criteria / Monitoring / Contingency Plan

We propose the following specific measureable criteria for evaluating whether or not the goals and objectives of this mitigation and restoration plan have been met:

1. One year after planting, all restoration plantings on site shall be inspected to confirm at least a 90 percent survival rate of all of the plantings.
2. One year after installation, the site shall be inspected to confirm that no erosion control issues have developed.
3. If it is determined that the aforementioned criteria have not been met, it shall be concluded that the goals of the restoration plan have not been met, and appropriate measures shall be undertaken to ensure that the goals are met (i.e., additional restoration planting in areas where plants have not survived, and implementation of additional erosion control measures to reverse erosion control issues that have arisen).

Descriptions / Specifications of the Restoration / Mitigation Plan

Planting Restoration Plan –Sheet 6, Planting Plan, describes the proposed planting / restoration plan for the site.

KANE ENVIRONMENTAL INC

September 29, 2009

Barker Landscape Architects PS
Attention: Mr. John Barker
1514 NW 52nd Street
Seattle, WA 98107

RE: LIMITED ENGINEERING GEOLOGY INVESTIGATION
Proposed Newcastle Trailhead
A Portion of Parcel No. 2624059048
Newcastle Golf Club Road Near 155th Avenue Southeast
Newcastle, Washington

Dear Mr. Barker:

This report presents the results of our Limited Engineering Geology Investigation for the proposed Newcastle Trailhead located along a portion of 155th Avenue Southeast near its intersection with Newcastle Golf Club Road in Newcastle, Washington. The scope of this study was outlined in our proposal dated September 21, 2009.

Proposed Construction

We understand that the proposed construction includes a new trailhead parking lot and sand storage area. The parking lot may include pavements or pervious pavements depending on the stormwater system utilized. Proposed stormwater management includes either pervious pavement with infiltration or raingardens. The storage area will include ecology blocks stacked in order to enclose soils used for sanding area roadways.

We have received and reviewed the site plan by Lovell-Sauerland Associates, Inc. showing the current topography and locations of certain trees and utility structures.

We have not yet received a grading plan for the project. Preliminarily, we anticipate maximum cuts and/or fill depths on the order of approximately 4 feet or less. In the event that the grading information detailed in this report is inconsistent with the final design, we should be notified so that we may update this writing as applicable.

Site Conditions

The site is a part of Parcel No. 2624059048 with approximate dimensions of 250 feet in the NW to SE direction and 200 feet in the NE to SW direction. The site is located along and to the NE of Newcastle Golf Club Road in Newcastle, Washington (Figure 1).

The site has been locally re-graded and there are evident areas of cuts and fills present. A majority of the central portion of the site is covered with approximately 6 inches of 2 to 4 inch sized quarry rock which appear to have been compacted into the existing subgrade materials. Cuts up to 6 feet in height have been made along the southwest and northwest portions of the site and have slope magnitudes of approximately 50 to 80 percent.

An area of cuts of up to 6 feet in height is present around a large Maple tree located in the east-central portion of the site. These cuts are up to at least 100 percent in magnitude locally.

Areas of fill up to approximately 4 feet in thickness (based on visual observation and probing) are located in the north-central portion of the site just south of a steep slope located north of the site. These areas have been recently graded and covered with straw. A stormwater ditch extends onto the site at the southeast corner and extends along the eastern margin. This ditch is lined with quarry rock and is approximately 3 to 4 feet wide and 2 to 3 feet deep. The overall slope of this ditch is less than 30 percent in magnitude and the ditch extends downward toward the northeast and into a small basin. The basin has a small volume of water present and a 12 inch outflow structure is in place at its northern end. Straw is in place along the western side of the basin along a slope extending downward to the north and east.

A partially graveled roadway extends downward to the north to off-site areas from the north corner of the site. The areas to the north and northeast of the site slope downward with slope magnitudes on the order of 100 percent. The topographic relief from the top of the slope (on-site) to the base of the valley north of the site is approximately 50 feet based on King County Imap topography. The topographic relief across the site area is approximately 20 feet and overall the site slopes to the northeast.

The site and adjacent areas are vegetated with Cedar, Alder, Maple, Hemlock, and Cottonwood trees; as well as ferns, grasses, blackberries, and other herbaceous vegetation. The site is bordered to the northeast, southeast and northwest by Coal Creek Park and to the southwest by Newcastle Golf Club Road.

Geologic Setting

The site lies within the eastern portion of the Puget Lowland, near the foothills of the Cascade Mountains. The lowland is part of a regional north-south trending trough that extends from southwestern British Columbia to near Eugene, Oregon. North of Olympia, Washington, this lowland is glacially carved, with a depositional and erosional history including at least four separate glacial advances/retreats. The Puget Lowland is bounded to the west by the Olympic Mountains and to the east by the Cascade Range. The lowland is filled with glacial and nonglacial sediments consisting of interbedded gravel, sand, silt, till, and peat lenses. Near the foothills of the Cascade Mountains, areas of Tertiary Bedrock are exposed. These materials include sandstone, siltstone, conglomerate, and shale which were locally mined for coal. These rocks are in varying stages of weathering.

The Composite Geologic Map of King County, indicates that the property is underlain by Tertiary Bedrock. Tertiary Bedrock in this area includes the Renton Formation, and generally consists of siltstone, sandstone, shale, and conglomerate in various stages of weathering. This formation, among others in this area, was known to have coal seams which were mined in the past.

Field Investigation

A limited field investigation consisting of four exploratory hand borings, which ranged in depth from approximately 3 to 4.5 feet below the existing site grades, was completed for shallow subsurface exploration. A Kane Environmental, Inc. geologist completed the hand borings. The holes were excavated by manually advancing a metal rod hand auger with a bucket type bit. The metal rods were pin connected and the hand auger was turned with a T-handle.

The soils encountered in the exploratory hand borings were continuously examined and visually classified in accordance with the Unified Soil Classification System (USCS).

Figure 2 shows the approximate locations of the exploratory hand borings. Representative samples of the subsurface soils encountered in the hand borings were collected and sealed in plastic bags. These samples were transported to our office for storage and further examination.

Soil Profile and Subsurface Conditions

The subsurface conditions observed within the exploratory hand borings appeared to be typical of those encountered in the geologic region of the site.

Exploratory Hand Borings HB-1 through HB-3 encountered 0 to 3 inches of topsoil and vegetation underlain by approximately 2 to 2.5 feet of loose to medium dense, silty-fine to medium grained sand with clasts of unweathered sandstone and shale (Renton Formation). This layer was underlain by medium dense, silty-fine to medium grained sand with local pieces of sandstone (Renton Formation) down to the termination depth of the hand boring. Exploratory Hand Boring HB-4 encountered approximately 2 feet of loose to medium dense, silty fine to medium grained sand with gravel and pieces of carbonized wood and coal (Fill). This layer was underlain by medium dense, silty-fine to medium grained sand with variable amounts of sandstone and shale (Renton Formation) down to the termination depth of the hand boring.

For additional information about the soils encountered, please refer to the attached logs of the exploratory hand borings.

Groundwater

The hand borings were checked for the presence of groundwater during and immediately following the excavation operations. Groundwater was not encountered in the hand borings at the date and time of our investigation.

It should be recognized that water table elevations may fluctuate with time. The groundwater level will be dependent upon seasonal precipitation, irrigation, land use, and climatic conditions, as well as other factors. Therefore, water levels at the time of the field investigation may be different from those encountered during the construction phase of the project. The evaluation of such factors is beyond the scope of this report.

Groundwater flow may become heavier during construction, which takes place during the wet weather season. This may cause difficulties with the grading and excavation work. Certain remedial and/or de-watering measures may be required.

Landslide Hazard

The site is not designated by King County as having landslide hazards; however, it is our opinion that there is a steep slope and erosion hazard just north and northeast of the site. This area, as well as local cut slopes throughout the site, has slope magnitudes on the order of 100 percent.

Our site observations indicated no evidence of historic landslide activity or slope movement. We did not observe head scarps, hummocky terrain, significant number of curved tree trunks, back rotated benches, sloughing soils, groundwater seepage emanating from slope faces and/or discontinuous vegetation patterns. We observed no tension cracks near the tops of the site slopes and no permeable soil strata were observed above less permeable soils or bedrock. In addition, we observed no bedding planes or joint systems within exposed slope areas.

It is our opinion; based on our knowledge of the near surface site soils and the proposed development that detailed slope stability analyses are not required. It is also our opinion that detailed survey work and additional analyses for the site slope conditions are not warranted. It is our opinion that the parking area may be located up to 10 feet from the top of the slope, provided adequate measures are taken to minimize erosion near/on the site slopes both during and following construction activities.

Erosion and retreat of the slopes may be maintained at a relatively moderate rate with this type of slope environment if the slope areas are adequately vegetated, and surface water runoff is directed away from the slopes. The possibility for activating potential slide planes and/or accelerating general slope retreat does exist, if drainage and erosion are not properly managed.

The removal of native vegetation should be limited, to the greatest extent possible (outside areas designated for landscaping and structural development) and landscaping and other permanent erosion control features should be in place to reduce adverse impacts to neighboring and down slope properties resulting from erosion. Vegetation should not be removed from steeper slope areas without protection of exposed soils.

Erosion Hazard

The Natural Resources Conservation Services (NRCS) maps for King County indicates that the site is underlain by Alderwood and Kitsap Soils (AkF) and Beausite gravelley sandy loam (BeD). These soils have a "Severe" and "Moderate" to "Severe" erosion potential in a disturbed state, respectively.

It has been our experience that soil erosion potential can be minimized through landscaping and surface water runoff control. Typically erosion of exposed soils will be most noticeable during periods of rainfall and may be controlled by the use of normal temporary erosion control measures, i.e., silt fences, hay bales, mulching, control ditches or diversion trenching, and contour furrowing. Erosion control measures should be in place before the onset of wet weather. Under no circumstances should surface water be allowed to flow over the steep slope areas located north and northeast of the project site.

Seismic Hazard

The native soils encountered in the exploratory hand borings were generally medium dense below a highly weathered zone. The overall soil profile corresponds to a soil profile Site Class *D* as defined by Table 1613.5.2 of the 2006 International Building Code (2006 IBC). A Site Class *D* applies to a profile consisting of medium dense/stiff to very dense soils within the upper 100 feet.

We referenced the U.S. Geological Survey (USGS) Earthquake Hazards Program Website to obtain values for S_S, S_1, F_a, and F_v. The USGS website includes the most updated published data on seismic conditions. The site specific seismic design parameters and adjusted maximum spectral response acceleration parameters are as follows:

PGA (Peak Ground Acceleration, in percent of g)

31.44 (10% Probability of Exceedence in 50 years)

62.21 (2% Probability of Exceedence in 50 years)

S_S 140.10% of g

S_1 47.60% of g

F_A 1.00

F_V 1.52

Additional seismic considerations include liquefaction potential and amplification of ground motions by soft soil deposits. The liquefaction potential is highest for loose sand with a high groundwater table. Our scope of work did not include liquefaction analyses; however, based on our hand borings and knowledge of the area geology, we do not expect significant settlement or effects from liquefaction.

Coal Mine Hazard

The site is within a Coal Mine Hazard area as designated by King County. Underground coal mine workings present a number of hazards that can affect people, lifelines, and structures. Methods used to investigate the presence of underground coal mines and their associated hazards include geotechnical investigations with deep borings and geophysical investigations. These investigations and analyses can estimate the potential for subsidence based on the soil/rock conditions and depth of any voids or shafts. Our scope of work does not include an evaluation or investigation of the Coal Mine Hazard at the site. At this time, we understand that no structures are proposed at the site; however, the owner should be aware of potential subsidence that could occur as a result of the hazard, potentially causing property damage or loss of life. We can provide further investigation and analyses of this hazard upon request.

CONCLUSIONS AND RECOMMENDATIONS

General

Based on the findings of this investigation, it is our opinion that the existing native soils are generally suitable for support of the proposed pavements and storage area materials (ecology blocks). We generally encountered medium dense and firmer native soils approximately 1 to 2 feet below the existing site grades and near the existing subgrade in areas covered with quarry rock.

The existing quarry rock that has been compacted into the native soils may be suitable as a subgrade for the pavement sections. We recommend that these areas be proofrolled using a fully loaded double-axle dumptruck (10 yards of soil) prior to placing additional fill.

The near surface soils consist of highly weathered rock that is composed of silty-sand with variable amounts of clay and gravel. Infiltration of stormwater into these soils is limited due to their composition. Furthermore, it is

generally unsuitable to infiltrate stormwater at or near the top of steep slope areas. Infiltrated stormwater could potentially decrease the effective strength of the underlying soils, causing slope failures and heavy erosion.

We recommend that the existing site cut slopes be regraded to a permanent slope magnitude no steeper than 2.5H:1V (horizontal to vertical). The steep slope area located north and northeast of the site appears stable at this time. We recommend that any loose materials located near the top of this slope be removed and the areas be vegetated. Stormwater should not be allowed to flow over this slope area at any time during or after construction. Permanent grades should slope away from the top of any steep slopes.

The site soils are extremely moisture sensitive and will degrade during and following periods of precipitation. Construction traffic in conjunction with precipitation generally causes the underlying materials to degrade more quickly. We recommend that provisions for wet weather construction be included, such as imported structural fill, or that construction be performed during the summer months (generally June through September).

Site Preparation

Site clearing should be limited to the areas necessary for construction of the parking lot and storage facility. Clearing should include removal of vegetation; trees and associated root systems; wood; existing utilities; structures including foundations, fill, basement walls and floors; rubble; and rubbish. Site stripping should extend to a minimum depth of 0 to 12 inches (preliminary; based on our hand boring locations and site observations), or until all organics in excess of 3 percent by volume are removed. These materials will not be suitable for use as structural fill. However, stripped topsoil may be stockpiled and reused in landscape or non-structural areas.

After stripping operations, the areas of proposed development should be visually inspected to identify any loose areas. Any remaining loose soils should be overexcavated to the level of the medium dense native soils. The resulting excavations should be filled with approved on site material, or imported structural fill. Structural fill material should be within ± 2 percent of the optimum moisture content, and the soils should be compacted to a minimum of 95 percent of the maximum dry density based on ASTM Test Method D1557.

During wet weather conditions, typically October through May, subgrade stability problems and grading difficulties may develop due to excess moisture, disturbance of sensitive soils and/or the presence of perched groundwater. Construction during the extended wet weather periods could create the need to overexcavate exposed soils if they become disturbed and cannot be recompacted due to elevated moisture contents. The on site native soils have variable silt contents and are considered moisture sensitive.

If overexcavation is necessary, it should be confirmed through continuous monitoring and testing by a qualified geotechnical engineer or senior geologist. Soils that have become unstable may require drying and recompaction. Selective drying may be accomplished by scarifying or windrowing surficial material during extended periods of dry, warm weather (typically during the summer months). If the soils cannot be dried back to a workable moisture condition, remedial measures may be required. General project site winterization should consist of the placement of aggregate base and the protection of exposed soils during the construction phase. It should be understood that even if Best Management Practices (BMP's) for wintertime soil protection are implemented and followed there is a significant chance that moisture disturbed soil mitigation work will still be required.

A representative of our firm should be present during all site clearing and grading operations to test and observe earthwork construction. This testing and observation is an integral part of our service, as acceptance of earthwork construction is dependent upon compaction and stability of the material. The engineering geologist or qualified representative may reject any material that does not meet compaction and stability requirements. Further recommendations, contained in this report, are predicated upon the assumption that earthwork construction will conform to the recommendations set forth in this section and in the Structural Fill Section.

Temporary Excavations

The on site soils have variable cohesion strengths, therefore the safe angles to which these materials may be cut for temporary excavations is limited, as the soils may be prone to caving and slope failures in temporary excavations deeper than 4 feet. Temporary excavations in the loose to medium dense soils should be sloped no steeper than 1.5H:1V (horizontal to vertical) where room permits. If the soil in the excavation is subject to vibration from heavy traffic, the temporary excavation should be sloped no steeper than 2H:1V.

All temporary cuts should be in accordance with the Washington Administrative Code (WAC) Part N, Excavation, Trenching, and Shoring. The temporary slope cuts should be visually inspected daily by a qualified person during construction work activities and the results of the inspections should be included in daily reports. The contractor is responsible for maintaining the stability of the temporary cut slopes and minimizing slope erosion during construction. The temporary cut slopes should be covered with visqueen or other approved erosion control measures to help minimize erosion during wet weather and the slopes should be closely monitored until the permanent retaining systems are complete. Materials should not be stored and equipment operated within 10 feet of the top of any temporary cut slope or natural slope steeper than 50 percent.

If any variations or undesirable conditions are encountered during construction Kane Environmental, Inc. should be notified so that supplemental recommendations can be made.

Structural Fill

Best Management Practices (BMP's) should be followed when considering the suitability of native material for use as structural fill. The native soils have variable fines (silt and clay) contents and are considered moisture sensitive. The native soils may also have elevated natural moisture contents, and may need to be dried back during dry, warm weather (typically during the summer months). The native soils are generally considered suitable for reuse as structural fill, provided the soil is relatively free of organic material and debris, and it is within ± 2 percent of the optimum moisture content. If the native soils are stockpiled for later use as structural fill, the stockpiles should be covered to help protect the soil from wet weather conditions. We recommend that a representative of Kane Environmental be on site during the excavation work to determine which soils are suitable for structural fill.

The native soils are highly moisture sensitive and may not be able to be used for structural fill during/after precipitation or in their current state. These types of soils generally have moisture contents higher than optimum in their natural state. An allowance for importing structural fill should be incorporated into the construction cost of the project (for wintertime construction this may be as high as 100 percent import).

Imported structural fill material should consist of well-graded gravel or a sand and gravel mixture with a maximum grain size of 3 inches and less than 5 percent fines (material passing the U.S. Standard No. 200 Sieve). All structural fill material should be submitted for approval to the engineering geologist prior to placement and compaction.

Fill soils should be placed in horizontal lifts not exceeding 10 inches loose thickness, moisture-conditioned as necessary, (moisture content of soil shall not vary by more than ±2 percent of optimum moisture) and the material should be compacted to at least 95 percent of the maximum dry density based on ASTM Test Method D1557. In place density tests should be performed on all structural fill to verify proper moisture content and adequate compaction. Additional lifts should not be placed if the previous lift did not meet the compaction requirements or if soil conditions are not considered stable.

Groundwater Influence on Construction

Groundwater was not encountered in the hand borings during our field exploration work. If groundwater is encountered during the construction work, the groundwater would most likely be perched. This perched groundwater develops where vertical infiltration of surface precipitation is impeded by a relatively impermeable soil layer, resulting in horizontal migration of the groundwater within overlying more permeable soils. If groundwater is encountered during construction, we should observe the conditions to determine if de-watering will be needed. Design of temporary dewatering systems to remove groundwater should be the responsibility of the contractor. Based on our exploration work , we do not anticipate the need for de-watering.

If earthwork is performed during or soon after periods of precipitation, the subgrade soils may become saturated. These soils may "pump," and the materials may not respond to densification techniques. Typical remedial measures include: discing and aerating the soil during dry weather; mixing the soil with drier materials; removing and replacing the soil with an approved fill material. Kane Environmental should be consulted prior to implementing remedial measures to observe the unstable subgrade conditions and provide appropriate recommendations.

Erosion Control

Erosion and sediment control (ESC) is used to minimize the transportation of sediment to wetlands, streams, lakes, drainage systems, and adjacent properties. Erosion and sediment control measures should be taken and these measures should be in general accordance with local regulations. As a minimum, the following basic recommendations should be incorporated into the design of the erosion and sediment control features of the site:

1) Phase the soil, grading, utility, and other work, requiring excavation or the disturbance of the site soils, to take place during the dry season (generally May through September). However, provided precautions are taken using Best Management Practices (BMP's), limited grading activities can be undertaken during the wet season (generally October through April). It should be noted that this typically increases the overall cost of the project.

2) All site work should be completed and stabilized as quickly as possible.

3) Additional perimeter erosion and sediment control features may be required to reduce the possibility of sediment entering the surface water. This may include additional silt fences, silt fences with a higher Apparent Opening Size (AOS), construction of a berm, or other filtration systems.

4) Any runoff generated by dewatering discharge should be treated through construction of a sediment trap if there is sufficient space. If space is limited other filtration methods will need to be incorporated.

5) Vegetation should be re-established in landscaped and slope areas prior to the onset of wet weather (typically October through April).

Drainage and Landscaping

The ground surface should slope away from pavement areas and steep slopes, toward appropriate drop inlets or other surface drainage devices. Subgrade soils in pavement areas should be sloped a minimum of 1 percent and drainage gradients should be maintained to carry all surface water to collection facilities, and/or dispersion trenches, away from slope surfaces. These grades should be maintained for the life of the project. The collection facilities and/or dispersion trenches should be tightlined away from slopes that exceed 30 percent and disposed of where down slope properties, structures and slopes are not jeopardized.

Specific recommendations for and design of storm water disposal systems or septic disposal systems are beyond the scope of our services and should be prepared by other consultants that are familiar with design and discharge requirements. Infiltration systems should not be located on slopes that exceed 30 percent nor should systems be "stacked" or lined up with one another down the slope. Infiltration systems should not be located up slope of residences or retaining structures.

Infiltration Rates

The preliminary stormwater systems for the site include pervious pavement or raingardens. We performed infiltration testing in two of the hand borings in accordance with the EPA Falling Head Test Method to determine suitable infiltration rates for the site soils.

The soil infiltration rates based on field testing through the EPA Falling Head Test Method is presented in the following table.

INFILTRATION RATES BASED ON FIELD TESTING AND TEXTURAL ANALYSIS			
Hand Boring	**Test Depth (feet)**	**Infiltration Rate (min./in.) No Factor of Safety**	**USDA Soil Classification Based on Visual Classification**
HB-1	1.5	36	Sandy Loam
HB-2	1	42	Sandy Loam

The infiltration rates presented above are based on field testing with clear water and soil textural analysis, and do not incorporate a factor of safety. Based on our analysis and review of King County regulations regarding stormwater management, infiltration through the use of pervious pavement is not feasible for this site due to the

proximity of the parking lot to a steep slope and erosion hazard area. The above infiltration rate may be used for a raingarden stormwater system (if applicable) that is located at least 40 feet from the top of the steep slope area. We recommend that stormwater not be allowed to flow over the steep slope area north of the site. A factor of safety should be used for any infiltration design.

Pavement Recommendations

The near surface subgrade soils generally consist of silty sand with variable amounts of gravel. These soils are rated as fair for pavement subgrade material. Based on the results of our analysis and observations of the site slopes and soils, we recommend that infiltration through pervious pavement not be utilized at the site for stormwater management.

We recommend that, at a minimum, 12 inches of the existing subgrade material be moisture conditioned (as necessary) and re-compacted to prepare for the construction of pavement sections. The subgrade should be compacted to at least 95 percent of the maximum dry density as determined by ASTM Test Method D1557. In place density tests should be performed to verify proper moisture content and adequate compaction. However, if the subgrade soil consists of firm and unyielding soils, a proof roll of the pavement subgrade soil may be performed in lieu of re-compacting the subgrade and compaction tests.

For paved parking aras, we recommend a minimum pavements section over the subbase consisting of 2 inches of Washington State Department of Transportation ½ inch HMA (formerly Class B) over at least 6 inches of compacted crushed rock base course (to at least 95 percent of the modified proctor ASTM D1557). The thickness of asphalt should be increased to 3 inches for the access roadway.

Testing and Inspection

A representative of Kane Environmental, Inc. should be present at the site during the earthwork activities to confirm that actual subsurface conditions are consistent with the exploratory fieldwork. This activity is an integral part of our services as acceptance of earthwork construction is dependent upon compaction testing and stability of the material. This representative can also verify that the intent of these recommendations is incorporated into the project design and construction. Kane Environmental, Inc. will not be responsible for grades or staking, since this is the responsibility of the Prime Contractor. Furthermore, Kane Environmental is not responsible for the contractor's procedures, methods, scheduling or management of the work site.

Limitations

Earthwork construction is characterized by the presence of a calculated risk that soil and groundwater conditions have been fully revealed by the original foundation investigation. This risk is derived from the practical necessity of basing interpretations and design conclusions on limited sampling of the earth. The recommendations made in this report are based on the assumption that soil conditions do not vary significantly from those disclosed during our field investigation. If any variations or undesirable conditions are encountered during construction, the Kane Environmental should be notified so that supplemental recommendations can be made.

The conclusions of this report are based on the information provided regarding the proposed construction. If the proposed construction is relocated or redesigned, the conclusions in this report may not be valid. Kane Environmental should be notified of any changes so that the recommendations can be reviewed and reevaluated.

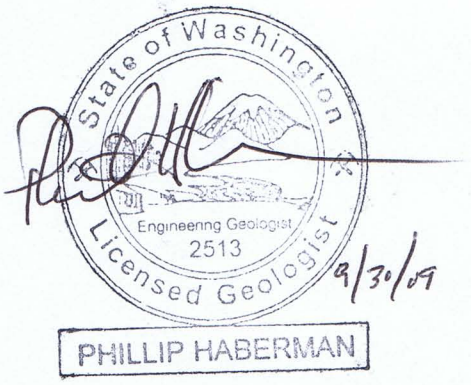
This report is a limited engineering geology report with the purpose of evaluating the soil conditions in terms of earthwork activities and geologic hazards. The scope of our services did not include any environmental site assessment for the presence or absence of hazardous and/or toxic materials in the soil, groundwater or atmosphere, or the presence of wetlands. Any statements, or absence of statements, in this report or on any hand boring log, regarding odors, unusual or suspicious items, or conditions observed are strictly for descriptive purposes and are not intended to convey engineering judgment regarding potential hazardous and/or toxic assessments. Also, the existing stormwater system near/at the site was not evaluated for performance or suitability.

The information presented herein is based upon professional interpretation utilizing standard practices and a degree of conservatism deemed proper for this project. It is not warranted that such information and interpretation cannot be superseded by future developments in the field of engineering geology. We emphasize that this report is valid for this project as outlined above, and should not be used for any other site.

We hope that this report provides the information required at this time. If you have any questions with this information, please contact our office at (206) 691-0476.

Respectfully submitted,

KANE ENVIRONMENTAL, INC.



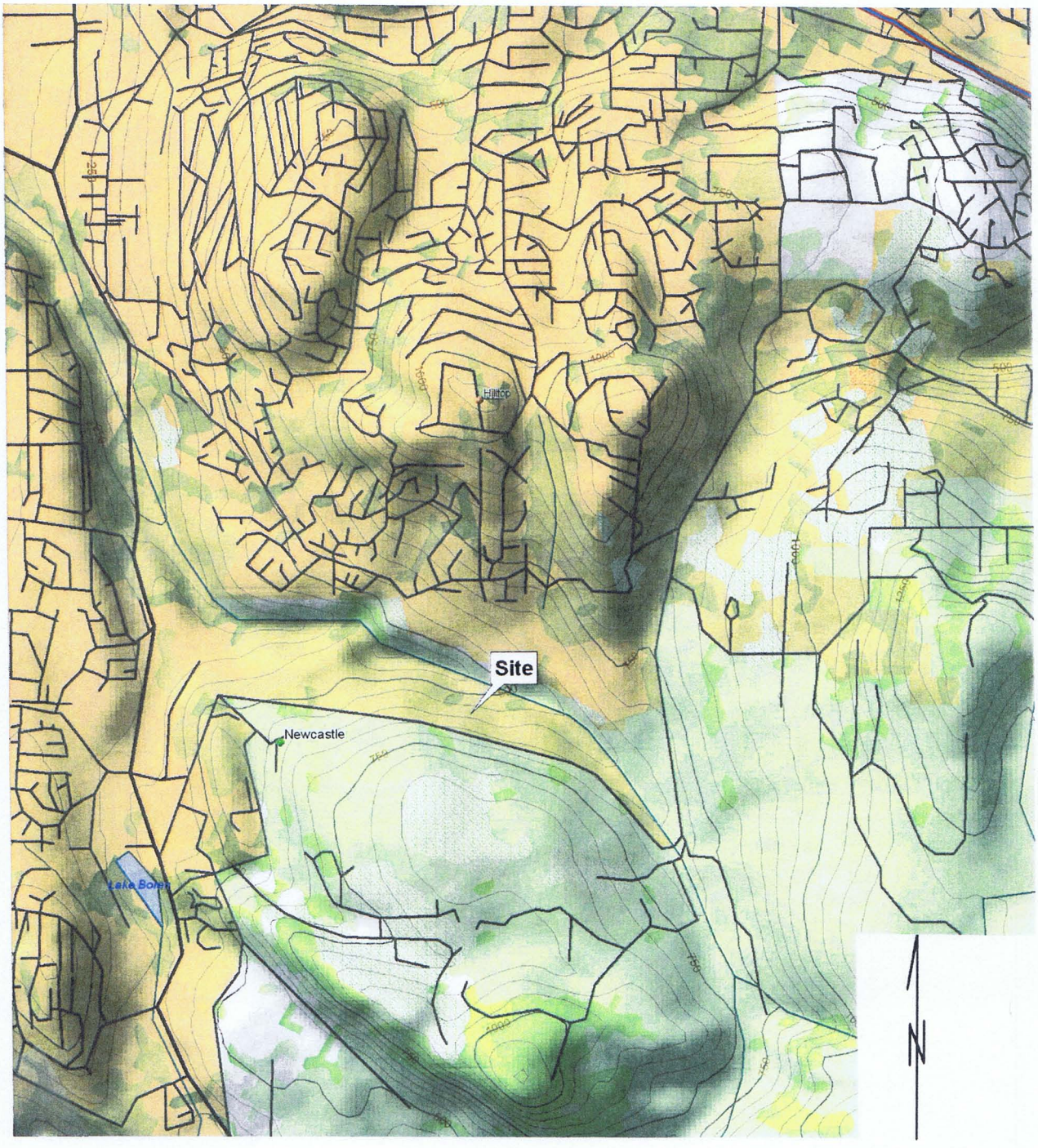
Phil Haberman, P.G., P.E.G.
Senior Engineering Geologist

PH/jk

Attachments: Figures (6)

References

King County Imap
Topographic Map by LSA (2009)
2006 King County Surface Water Design Manual
King County Executive Report – Chapter 5; Geologic Hazard Areas (February 2004)

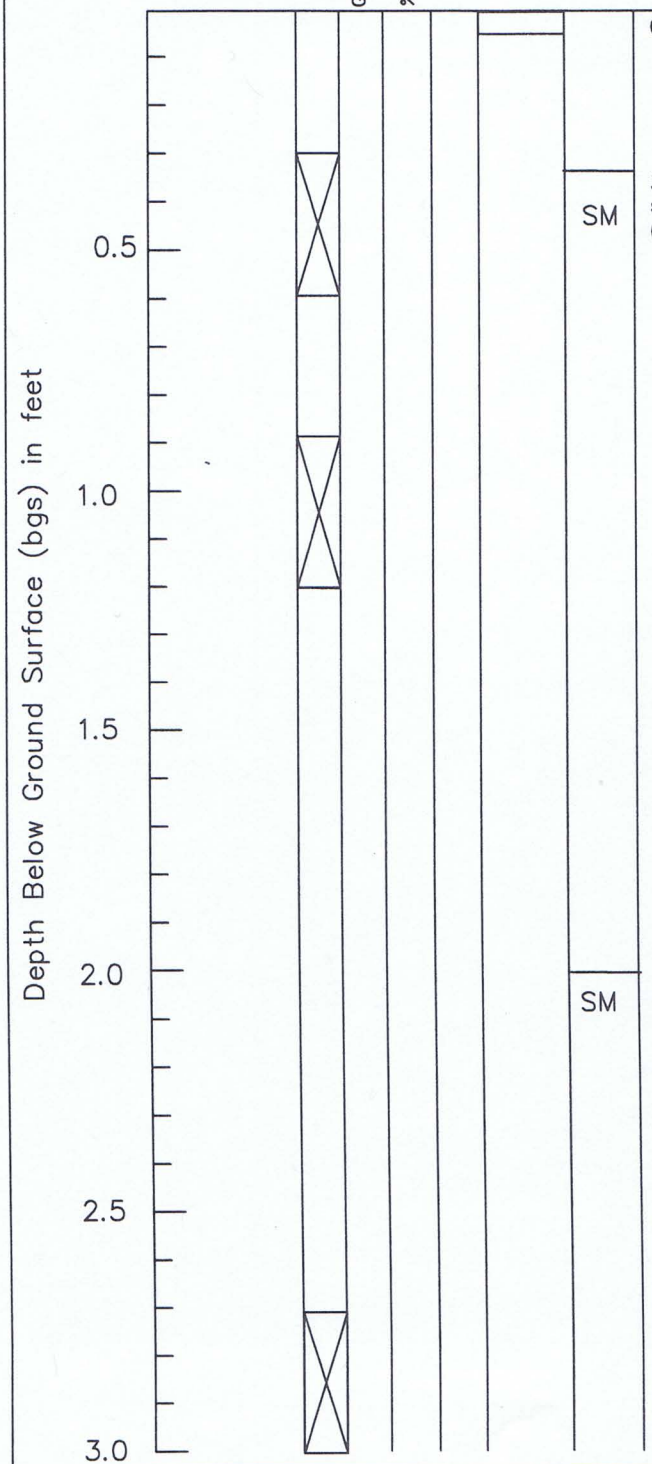


Note: Figure generated from Topo USA 2001. (not to scale)

Kane Environmental, Inc.
3831 Stone Way North
Seattle, WA 98103
206-691-0476

FIGURE 1 – VICINITY MAP

Location: Newcastle, Washington
Project: Newcastle Trailhead
Client: Barker Landscape Architects
Date: September 30, 2009



Soil Description

0–3": Vegetation and Topsoil

3"–2': Loose to medium dense, fine to medium grained sand, dark yellowish brown to reddish brown, moist. (Weathered Sandstone)

2'–3': Medium dense, fine to medium grained sand, dark yellowish brown to reddish brown, moist.

–Areas of cemented clasts

(Weathered Sandstone)

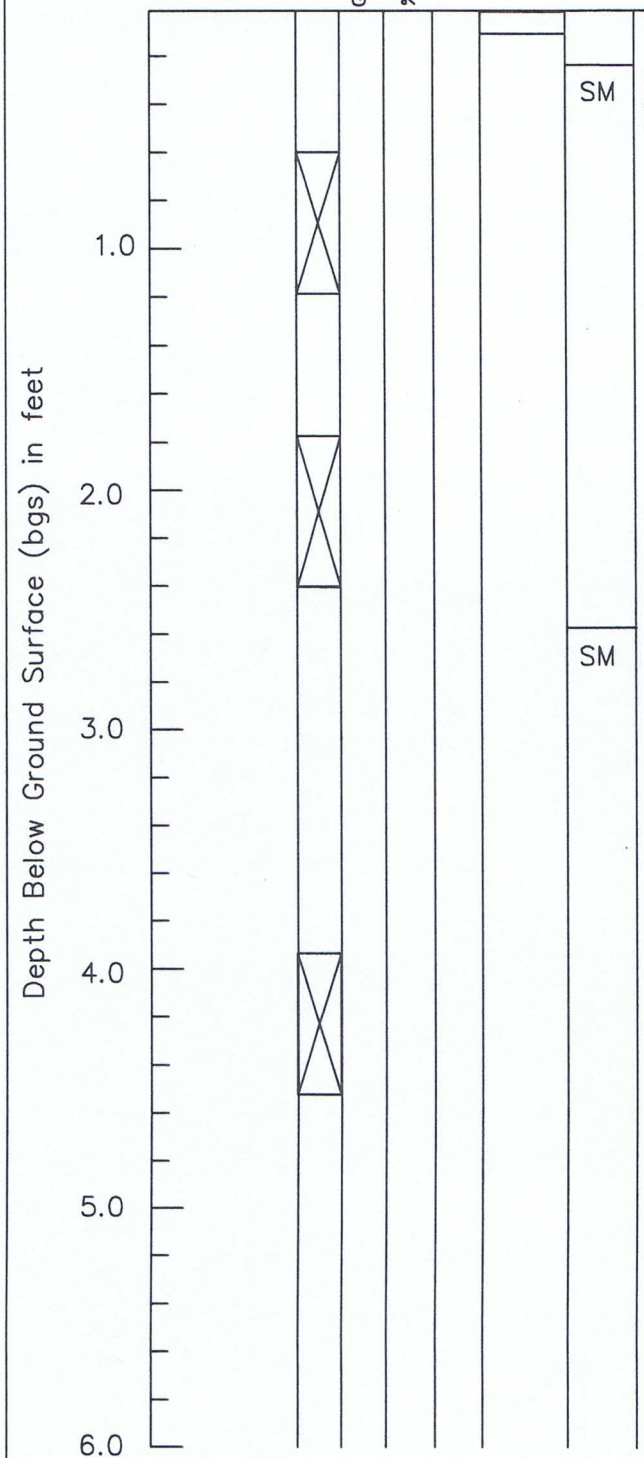
End of Hand Boring

Logged by: Phil Haberman	Hammer Size: NA	Depth to Water (First Encountered): None
Driller: Phil Haberman	Date Drilled: 9/25/09	Depth to Water (Static): None
Drilling Method: Hand Auger	Hole Diameter: 4 inches	
Sampling Method: Grab	Hole Depth: 3 feet	
Casing Type: N/A	Well Diameter: N/A	
Annular Pack: N/A	Well Depth: N/A	
Slot Size: N/A	Screened Interval: N/A	

KANE ENVIRONMENTAL INC
3831 Stone Way North, Seattle, WA - 206-691-0476
www.kane-environmental.com

Newcastle Trailhead and Storage Area
Newcastle Golf Club Road Near 155th Avenue Southeast, Newcastle, WA

Hand Boring Log



Soil Description

0–3": Vegetation and Topsoil

SM — 3"–2.5': Loose to medium dense, fine to medium grained sand, dark yellowish brown to reddish brown, moist. (Highly Weathered Sandstone)

SM — 2.5'–4.5': Medium dense, fine to medium grained sand, dark yellowish brown to reddish brown, moist.

–Areas of cemented clasts

(Weathered Sandstone)

End of Hand Boring

Logged by: Phil Haberman	Hammer Size: NA	Depth to Water (First Encountered): None
Driller: Phil Haberman	Date Drilled: 9/25/09	Depth to Water (Static): None
Drilling Method: Hand Auger	Hole Diameter: 4 inches	
Sampling Method: Grab	Hole Depth: 4.5 feet	
Casing Type: N/A	Well Diameter: N/A	
Annular Pack: N/A	Well Depth: N/A	
Slot Size: N/A	Screened Interval: N/A	

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Newcastle Trailhead and Storage Area
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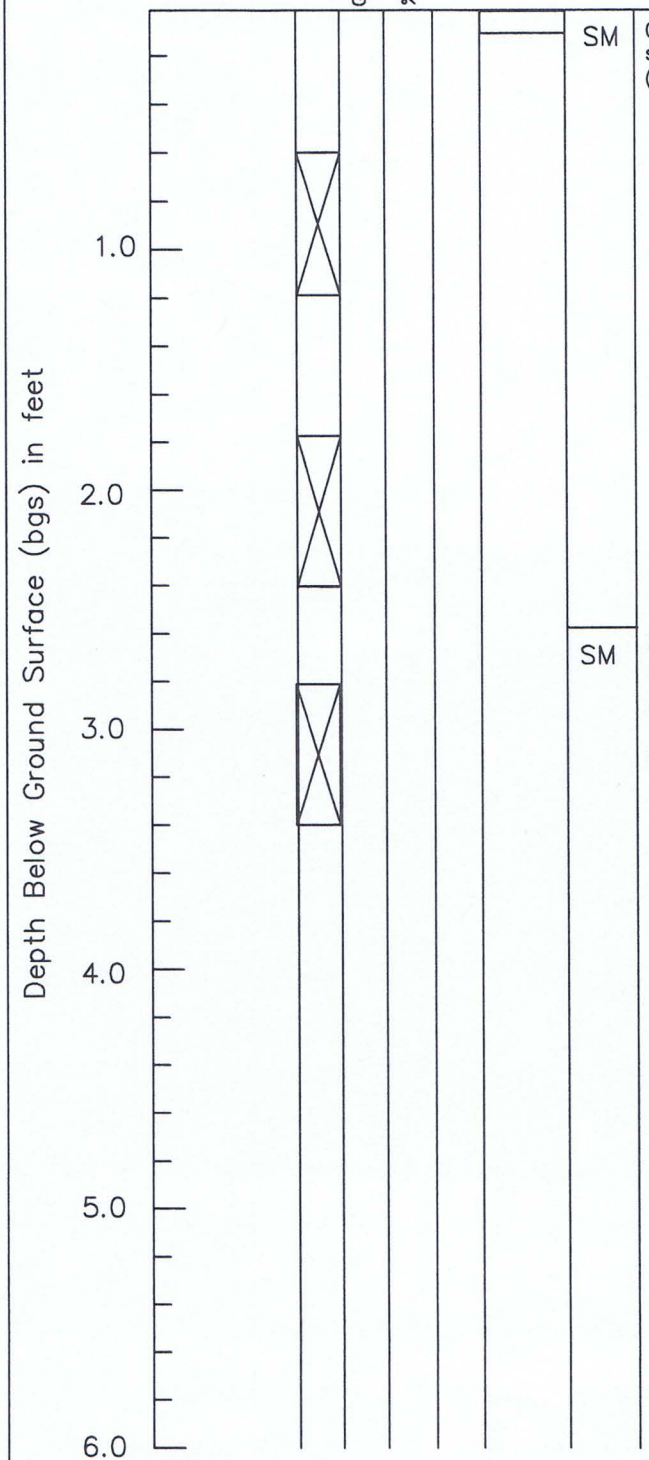
Hand Boring Log



Soil Description

SM — 0'–2': Loose to medium dense, fine to medium grained sand, dark yellowish brown to reddish brown, moist. (Highly Weathered Sandstone)

SM — 2'–4': Medium dense, fine to medium grained sand, dark yellowish brown to reddish brown, moist.

–Areas of cemented clasts

(Weathered Sandstone)

End of Hand Boring

Logged by: Phil Haberman	Hammer Size: NA	Depth to Water (First Encountered): None
Driller: Phil Haberman	Date Drilled: 9/25/09	Depth to Water (Static): None
Drilling Method: Hand Auger	Hole Diameter: 4 inches	
Sampling Method: Grab	Hole Depth: 4 feet	
Casing Type: N/A	Well Diameter: N/A	
Annular Pack: N/A	Well Depth: N/A	
Slot Size: N/A	Screened Interval: N/A	

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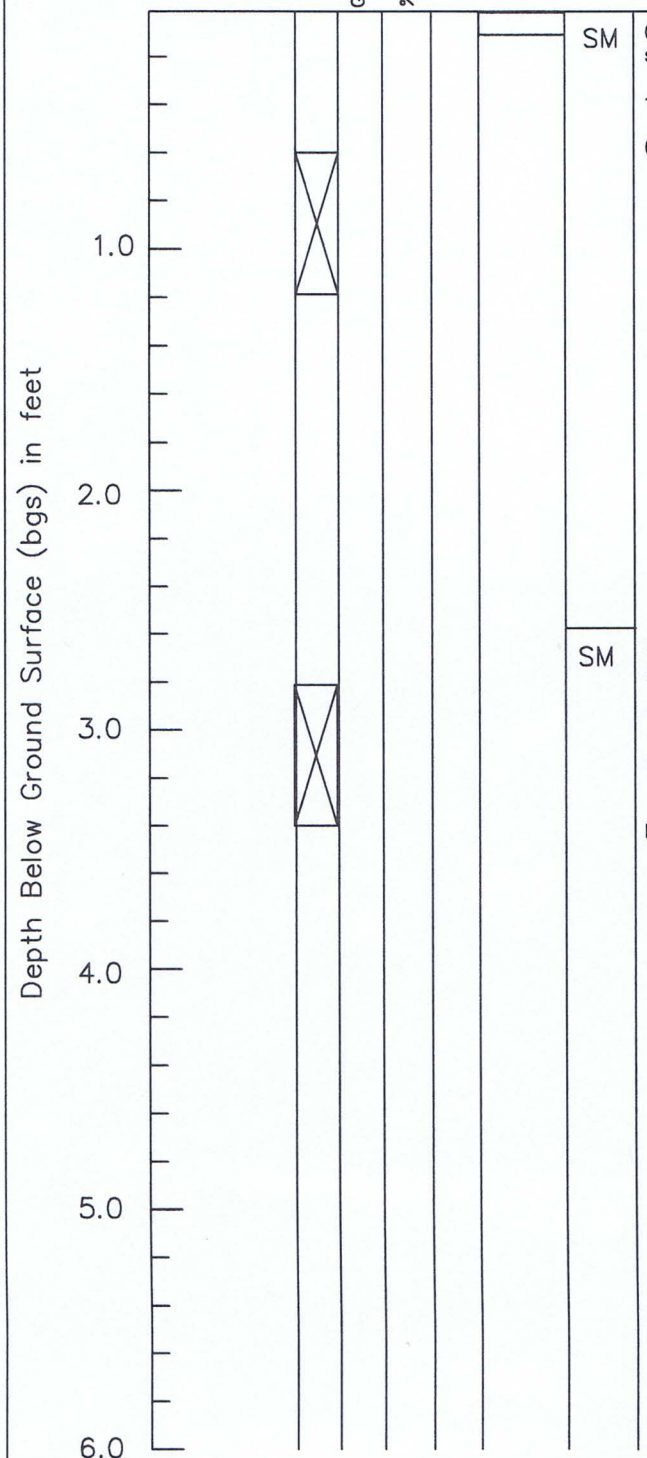

Soil Log	Soil Description
SM	0'–2': Loose to medium dense, fine to medium grained sand, dark yellowish brown, moist. –Areas of coal and shale (Fill)
SM	2'–4': Medium dense, fine to medium grained sand, dark yellowish brown to reddish brown, moist. –Areas of cemented clasts (Weathered Sandstone) End of Hand Boring

Logged by: Phil Haberman
Driller: Phil Haberman
Drilling Method: Hand Auger
Sampling Method: Grab
Casing Type: N/A
Annular Pack: N/A
Slot Size: N/A

Hammer Size: NA
Date Drilled: 9/25/09
Hole Diameter: 4 inches
Hole Depth: 3.5 feet
Well Diameter: N/A
Well Depth: N/A
Screened Interval: N/A

Depth to Water (First Encountered): None
Depth to Water (Static): None

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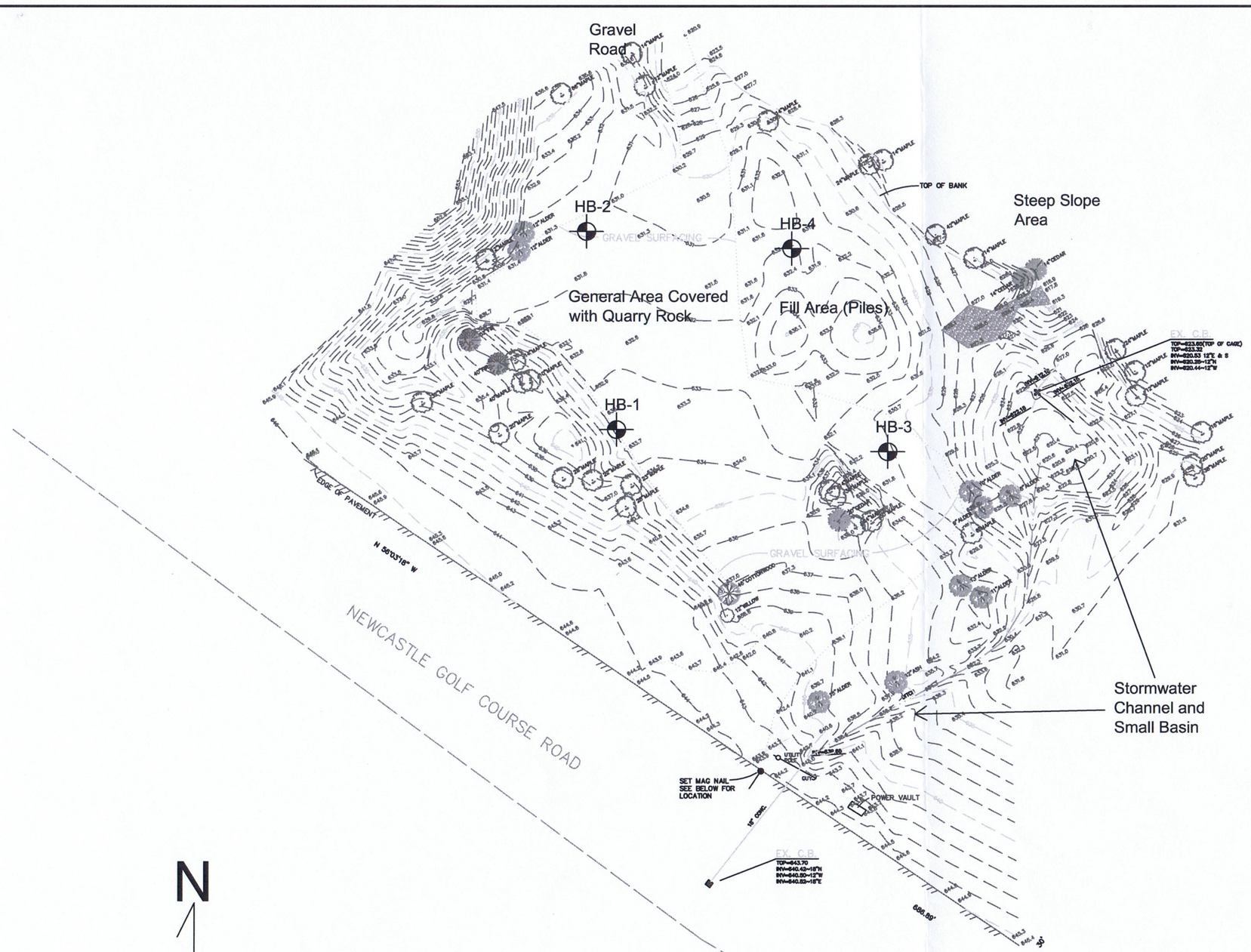
Newcastle Trailhead and Storage Area
Newcastle Golf Club Road Near 155th Avenue Southeast, Newcastle, WA

Hand Boring Log



LEGEND

HB-1 — Number and Approximate Location of Hand Boring

Reference: Drawing based on a topographic map provided by LSA

Site Plan - Explorations

Newcastle Trailhead		Figure 2
	For: John Barker	Drawn By: Phil H. Reviewed By: J.K.
Not to Scale	Kane Environmental, Inc.	Drawing Number: 1 Drawing Type: Site Plan

KANE
ENVIRONMENTAL INC

March 25, 2010

Bellevue Parks & Community Services Department
Mr. Geoffrey Bradley, Environmental Programs Supervisor
450 110th Ave. NE
P.O. Box 90012
Bellevue, WA 98009

RE: COAL MINE HAZARD REVIEW AND PRELIMINARY ANALYSIS
Proposed Lakemont Trailhead Parking Area
A Portion of Parcel No. 2624059048
Newcastle Golf Club Road Near 155th Avenue Southeast
Bellevue, Washington

Dear Mr. Bradley,

This report presents the results of our Coal Mine Hazard Review and Preliminary Analysis for the proposed Lakemont Trailhead Parking Area located along a portion of 155th Avenue Southeast near its intersection with Newcastle Golf Club Road in Bellevue, Washington. The scope of this study was outlined in our proposal dated March 1, 2010.

The site is located within Coal Mine Subsidence Zone 1 as determined by the City of Bellevue Land Use Code section 20.25H.130. The proposed construction at the site includes a new paved trailhead parking lot and sand storage area. The storage area will include ecology blocks stacked in order to enclose soils used for sanding area roadways.

The methodology for our study included the following:

- **Geologic Information Review** – Review available maps that contain information regarding site geology, topography, soil conditions, and other relevant site characteristics.

- **Geologic Reconnaissance** – Surface reconnaissance throughout the site area and surrounding areas to identify mining related workings, tailings, previous development and grading, topographic anomalies, and general land disturbance.

- **Mine Records Review** – Review available mine records and historic photographs to evaluate the location and depth of mining activities in the area of the site, as well as mining methods, bedrock dip, and coal thicknesses in the area of the site.

- **Preliminary Analysis** – Referencing available mine location data and superimposing the location of mines onto a site plan. Prepare a cross section using new and old topographic and mine location maps to determine and verify the depth of mining activities at the site.

Background Information

The following documents were reviewed as part of our study; many of which provided information regarding historic mining in the area of the site, geology, and soil conditions.

- City of Bellevue Land Use Code, Chapter 20.25H, Coal Mine Hazard Areas.
- Evans, George W., 1912, "The Coal Fields of King County," Washington Geological Survey Bulletin No. 3.
- GeoMapNW, 2007, "Geologic Map of King County".
- Green, Stephen H., 1943, "Coal and Coal Mining in Washington," Washington State Division of Mines and Mining Report of Investigations No. 4.'
- International Building Code (IBC), 2006
- LaSalata, et. al., 1985, "Inventory of Abandoned Coal Mines in the State of Washington," Washington State Division of Geology and Earth Resources Open File Report 84-6.
- Natural Resources Conservation Service (NRCS), Soil Survey of King County.
- Phillips, William M., et. al., 1982, "Analyses and Measured Sections of Washington Coals," Washington Division of Geology and Earth Resources Open File Report 82-5.
- Schasse, Henry W., et. al., 1994, "The Washington State Coal Mine Map Collection: A Catalog, Index, and User's Guide," Washington State Division of Geology and Earth Resources Open File Report 94-7.
- Walsh, T.J., 1983, "Map of Coal Mine Workings in Part of King County," Washington State Division of Geology and Earth Resources Open File Report 83-17.
- Walsh, T.J., 1984, "Geology and Coal Resources of Central King County, Washington," Washington State Division of Geology and Earth Resources Open File Report 84-3.
- Walsh, T.J., 1985, "Inventory of Abandoned Coal Mines in the State of Washington," Washington State Division of Geology and Earth Resources Open File Report 84-6.
- Walsh, T.J., Logan, Robert L., 1989, "Engineering Geology in Washington, Volume I - Land Subsidence in Washington," Washington State Division of Geology and Earth Resources Bulletin 78.

Site Description

The site is a part of Parcel No. 2624059048 with approximate dimensions of 250 feet in the NW to SE direction and 200 feet in the NE to SW direction. The site is located along and to the NE of Newcastle Golf Club Road in Newcastle, Washington (Figure 1).

The site has been locally re-graded and there are evident areas of cuts and fills present. A majority of the central portion of the site is covered with approximately 6 inches of 2 to 4 inch sized quarry rock which appear to have been compacted into the existing subgrade materials. Cuts up to 6 feet in height have been made along the southwest and northwest portions of the site and have slope magnitudes of approximately 50 to 80 percent.

An area of cuts of up to 6 feet in height is present around a large Maple tree located in the east-central portion of the site. These cuts are up to at least 100 percent in magnitude locally.

Areas of fill up to approximately 4 feet in thickness (based on visual observation and probing) are located in the north-central portion of the site just south of a steep slope located north of the site. These areas have been recently graded and covered with straw. A stormwater ditch extends onto the site at the southeast corner and extends along the eastern margin. This ditch is lined with quarry rock and is approximately 3 to 4 feet wide and 2 to 3 feet deep. The overall slope of this ditch is less than 30 percent in magnitude and the ditch extends downward toward the northeast and into a small basin. The basin has a small volume of water present and a 12 inch outflow structure is in place at its northern end.

A partially graveled roadway extends downward to the north to off-site areas from the north corner of the site. The areas to the north and northeast of the site slope downward with slope magnitudes on the order of 100 percent. The topographic relief from the top of the slope (on-site) to the base of the valley north of the site is approximately 50 feet based on King County Imap topography. The topographic relief across the site area is approximately 20 feet and overall the site slopes to the northeast.

The site and adjacent areas are vegetated with Cedar, Alder, Maple, Hemlock, and Cottonwood trees; as well as ferns, grasses, blackberries, and other herbaceous vegetation. The site is bordered to the northeast, southeast and northwest by Coal Creek Park and to the southwest by Newcastle Golf Club Road.

Geologic Setting

The site lies within the eastern portion of the Puget Lowland, near the foothills of the Cascade Mountains. The lowland is part of a regional north-south trending trough that extends from southwestern British Columbia to near Eugene, Oregon. North of Olympia, Washington, this lowland is glacially carved, with a depositional and erosional history including at least four separate glacial advances/retreats. The Puget Lowland is bounded to the west by the Olympic Mountains and to the east by the Cascade Range. The lowland is filled with glacial and nonglacial sediments consisting of interbedded gravel, sand, silt, till, and peat lenses. Near the foothills of the Cascade Mountains, areas of Tertiary Bedrock are exposed. These materials include sandstone, siltstone, conglomerate, and shale which were locally mined for coal. These rocks are in varying stages of weathering.

The Composite Geologic Map of King County indicates that the property is underlain by Tertiary Bedrock. Tertiary Bedrock in this area includes the Renton Formation, and generally consists of siltstone, sandstone, shale, and conglomerate in various stages of weathering. This formation, among others in this area, was known to have coal seams which were mined in the first half of the 20th century.

Coal Mine Hazards

Mine Reconnaissance

We reviewed historic aerial photographs (dating to 1936), historic mine maps, and conducted traverses across the site and adjacent areas to determine the existence of any mine shafts, portals, adits, spoils, structures, or any surface features indicating past mining activities at the site. We observed mine tailing piles to the west and north of the site along with evidence of previous grading within the site. Historic aerial photographs indicate that an

access roadway extended through the site and toward the northwest and Coal Creek. An gravel improved roadway currently extends along this alignment. Also, the photographs and site observations of previous grading indicate that Newcastle Golf Club Road (formerly Coal Creek County Road) was located north of its current location, just within the site.

Site reconnaissance and historic photograph and map review indicate that sinkholes related to surface mining as well as mine openings are located several hundred feet south and east of the site, in the areas of the Newcastle Golf Course and Coal Creek along the existing trail. These mining related surface features are located in areas where the mines are at or near the ground surface and not within the proposed trailhead parking area. A review and comparison of historic and recent topographic maps for the site area indicate a general consistency in topography at the site with no evidence of significant subsidence or sinkhole development.

Documented Mining

Based on our review and analysis of coal mine maps and topographic maps, the site is underlain by the Pacific Coast Coal Companies 3rd Level (Gangway) of the Number 3 Seam as shown in Figure 2. This mine was active from 1899 to 1900 with a removal of approximately 140,000 tons of coal; from 1925 to 1926 with a removal of approximately 16,500 tons of coal; and from 1928 to 1929 with a removal of approximately 610,000 tons of coal.

The thickness of coal mined was approximately 17 feet for the Number 3 Seam and the seam was underlain by a thin layer of shale and massive sandstone, and directly overlain by thickly bedded shale.

The coal was removed using room-and pillar mining methods where coal "pillars" were left in place for roof support while coal was removed, creating "rooms". Eventually most or all of the coal supporting the roof was removed as mining retreated, causing collapse of the mined out areas.

Cross Section Analysis

Historic topographic mine maps were used to verify the anticipated depth of suspected mine workings beneath the site. One such map, Coal Creek Coal Field Feasibility Study for Newcastle Hills Landfill, included several cross sections, area topography, and location of mine workings. The provided cross sections indicate that the 3rd Level of the Number 3 Seam is located near a topographic elevation of 50 to 55 feet above sea level, approximately 570 to 580 feet below the site elevation, depending on the datum used.

An additional cross section through mine workings and the site was created using this map and the Map of Newcastle Area, by the Palmer Coking Coal Company dated May 1956 which shows the area topography, outcrop location of area coal seams, and Coal Creek County Road. A dip of 38 degrees for the bedrock and coal seams was used for our analyses. This value was repeatedly shown as the average dip of bedrock in this area in the referenced coal mine documents. Our cross analysis indicates that abandoned underground mine workings underlie the site at a depth of approximately 570 feet (Figure 3).

Other Geologic Hazards

Landslide Hazard

The steep slope extending along the northern margin of the proposed parking area is considered an erosion and landslide hazard area due to its magnitude (approximately 100 percent) and height (approximately 20 to 30 feet). The site is underlain by moderately competent bedrock materials which are dense and stable in their current condition.

Our site observations indicated no evidence of landslide activity or slope movement. We did not observe head scarps, hummocky terrain, significant number of curved tree trunks, back rotated benches, sloughing soils, groundwater seepage emanating from slope faces and/or discontinuous vegetation patterns. We observed no tension cracks near the tops of the site slopes and the site is underlain by predominately relatively competent bedrock materials.

It is our opinion; based on our knowledge of the near surface site soils and the proposed development that detailed slope stability analyses are not required. It is also our opinion that detailed survey work and additional analyses for the site slope conditions are not warranted. It is our opinion that the parking area may be setback 10 feet from the top of the slope, provided adequate measures are taken to minimize erosion near/on the site slopes both during and following construction activities and that permanent stormwater management restricts the flow of water over the slope area.

Erosion and retreat of the slopes may be maintained at a relatively low rate with this type of slope environment if the slope areas are adequately vegetated, and surface water runoff is directed away from the slopes. The possibility for activating potential slide planes and/or accelerating general slope retreat does exist, if drainage and erosion are not properly managed.

The removal of native vegetation should be limited, to the greatest extent possible (outside areas designated for landscaping and structural development) and landscaping and other permanent erosion control features should be in place to reduce adverse impacts to neighboring and down slope properties resulting from erosion. Vegetation should not be removed from steeper slope areas without protection of exposed soils.

Erosion Hazard

The Natural Resources Conservation Services (NRCS) maps for King County indicates that the site is underlain by Alderwood and Kitsap Soils (AkF) and Beausite gravelley sandy loam (BeD). These soils have a "Severe" and "Moderate" to "Severe" erosion potential in a disturbed state, respectively.

It has been our experience that soil erosion potential can be minimized through landscaping and surface water runoff control. Typically erosion of exposed soils will be most noticeable during periods of rainfall and may be controlled by the use of normal temporary erosion control measures, i.e., silt fences, hay bales, mulching, control ditches or diversion trenching, and contour furrowing. Erosion control measures should be in place before the onset of wet weather. Under no circumstances should surface water be allowed to flow over the steep slope areas located north and northeast of the project site.

Seismic Hazard

The site is underlain by glacial sediments and sedimentary rock. We conservatively estimate that the overall soil profile corresponds to a Site Class *D* as defined by Table 1613.5.2 of the 2006 International Building Code (2006 IBC). A Site Class *D* applies to a profile consisting of medium dense/stiff to very dense soils within the upper 100 feet.

Seismic considerations include liquefaction potential and amplification of ground motions by soft soil deposits. The liquefaction potential is highest for loose sand with a high groundwater table. Our scope of work did not include liquefaction analyses; however, based on our knowledge of the area geology, the site does not have hazards associated with liquefaction.

CONCLUSIONS AND RECOMMENDATIONS

General

Our conclusions regarding Coal Mine Hazards at the site are as follows:

- We did not observe mine opening, sinkholes, shafts or other mining related features within the area of the proposed trailhead parking area.
- Due to the type of mining conducted, amount of time since mining processes, and the depth of the workings, we estimate that the 3rd Level (Gangway) of the Number 3 Seam is likely fully collapsed.
- The 2nd Level of the Number 3 Seam is located approximately 300 feet south of the site and does not impact the site.

The site development includes minor stormwater utility lines and a flexible pavement section over the proposed parking areas. It is our opinion that no mitigation is required at this time based on our review of available historic mine information and the results of our preliminary analysis. The site is suitable for the development of the currently proposed parking lot; however, if development plans change significantly, we should be notified to determine if additional analyses are necessary.

We do no anticipate the presence of any undocumented mine workings underlying the site; however, the presence of any voids could be suitably determined through the drilling of one to two approximately 200 feet deep mud rotary borings within the southern portion of the site. A sudden loss of drilling fluid would indicate the presence of any significant voids.

Landslide Hazards

We recommend that vegetation be left in place on steep slope areas and that stormwater not be directed onto or over the existing steep slope areas along the northern margin of the site. Surcharge loading, such as paved parking/drive areas and any stockpiled materials, should be setback at least 10 feet from the top of the steep slope (approximate elevation 620'). It is our opinion that additional buffer requirements, beyond City of Bellevue requirements, are not necessary.

If constructed as proposed and with the considerations presented above, the proposed construction will not increase the threat of geologic hazards to the subject property or adjacent properties. Furthermore, the proposed development will not adversely affect other critical areas.

Erosion Control

Erosion and sediment control (ESC) is used to minimize the transportation of sediment to wetlands, streams, lakes, drainage systems, and adjacent properties. Erosion and sediment control measures should be taken and these measures should be in general accordance with local regulations. As a minimum, the following basic recommendations should be incorporated into the design of the erosion and sediment control features of the site:

1) Phase the soil, grading, utility, and other work, requiring excavation or the disturbance of the site soils, to take place during the dry season (generally May through September). However, provided precautions are taken using Best Management Practices (BMP's), limited grading activities can be undertaken during the wet season (generally October through April). It should be noted that this typically increases the overall cost of the project.

2) All site work should be completed and stabilized as quickly as possible.

3) Additional perimeter erosion and sediment control features may be required to reduce the possibility of sediment entering the surface water. This may include additional silt fences, silt fences with a higher Apparent Opening Size (AOS), construction of a berm, or other filtration systems.

4) Any runoff generated by dewatering discharge should be treated through construction of a sediment trap if there is sufficient space. If space is limited other filtration methods will need to be incorporated.

5) Vegetation should be re-established in landscaped and slope areas prior to the onset of wet weather (typically October through April).

Drainage and Landscaping

The ground surface should slope away from pavement areas and steep slopes, toward appropriate drop inlets or other surface drainage devices. Subgrade soils in pavement areas should be sloped a minimum of 1 percent and drainage gradients should be maintained to carry all surface water to collection facilities, and/or dispersion trenches, away from slope surfaces. These grades should be maintained for the life of the project. The collection facilities and/or dispersion trenches should be tightlined away from slopes that exceed 30 percent and disposed of where down slope properties, structures and slopes are not jeopardized.

Infiltration systems should not be located on slopes that exceed 30 percent nor should systems be "stacked" or lined up with one another down the slope. Infiltration systems should not be located up slope of residences or retaining structures.

Limitations

The conclusions of this report are based on the information provided regarding the proposed construction. If the proposed construction is relocated or redesigned, the conclusions in this report may not be valid. Kane Environmental should be notified of any changes so that the recommendations can be reviewed and reevaluated.

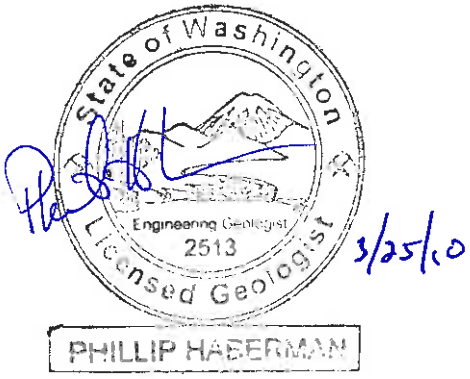
This report is a limited engineering geology report with the purpose of evaluating the soil conditions in terms of earthwork activities and geologic hazards. The scope of our services did not include any environmental site assessment for the presence or absence of hazardous and/or toxic materials in the soil, groundwater or atmosphere, or the presence of wetlands. Any statements, or absence of statements, in this report regarding odors, unusual or suspicious items, or conditions observed are strictly for descriptive purposes and are not intended to convey engineering judgment regarding potential hazardous and/or toxic assessments.

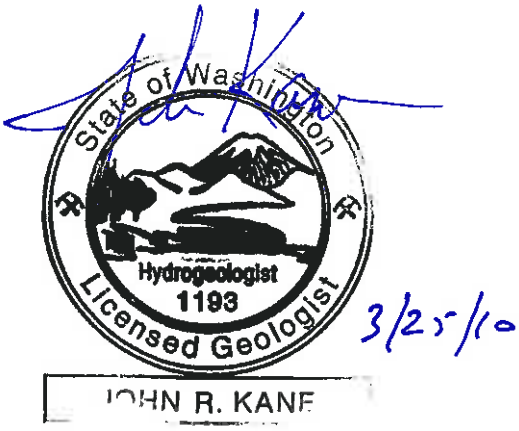
The information presented herein is based upon professional interpretation utilizing standard practices and a degree of conservatism deemed proper for this project. It is not warranted that such information and interpretation cannot be superseded by future developments in the field of engineering geology. We emphasize that this report is valid for this project as outlined above, and should not be used for any other site.

We hope that this report provides the information required at this time. If you have any questions with this information, please contact our office at (206) 691-0476.

Respectfully submitted,

KANE ENVIRONMENTAL, INC.



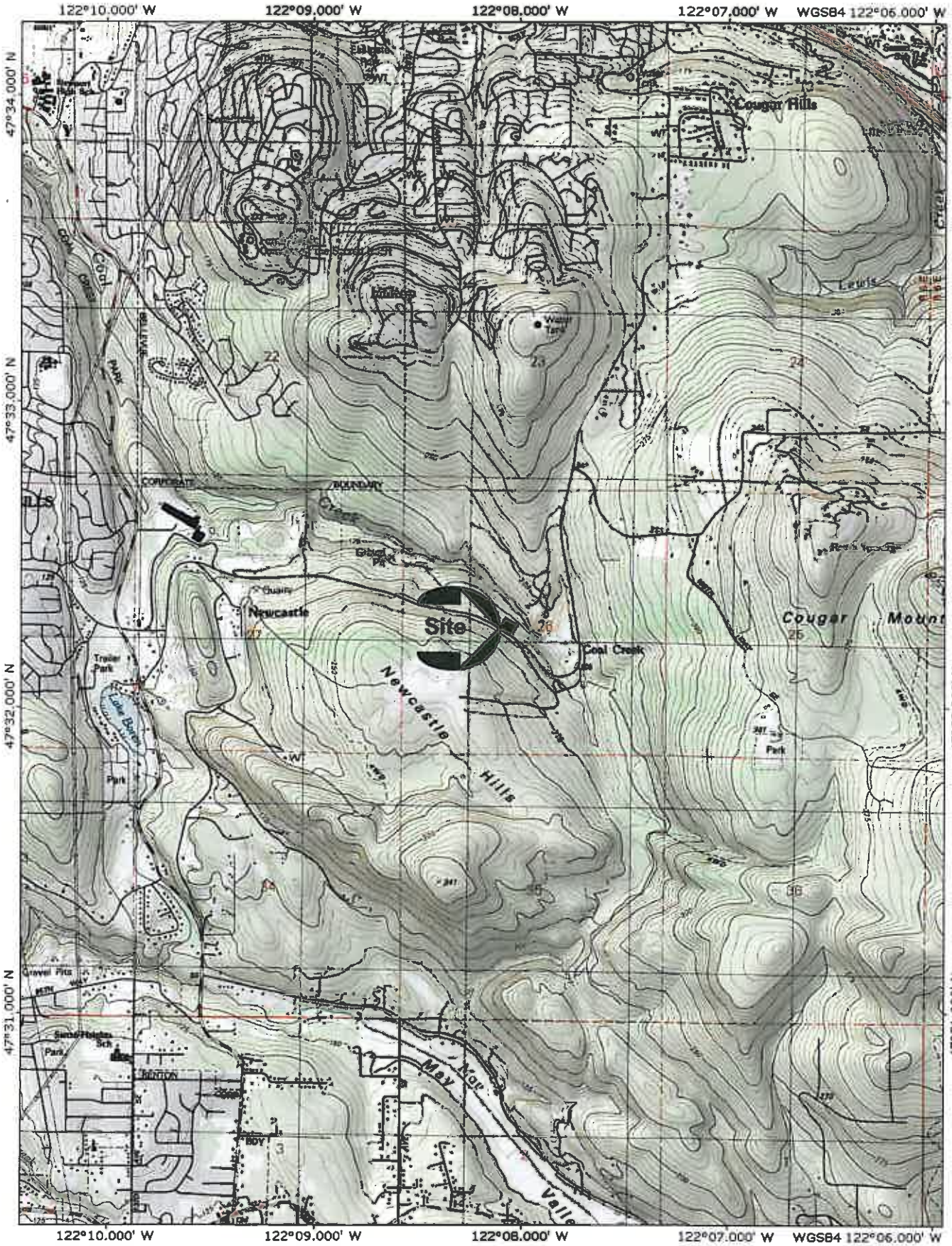


Phil Haberman, L.G., L.E.G.
Senior Engineering Geologist

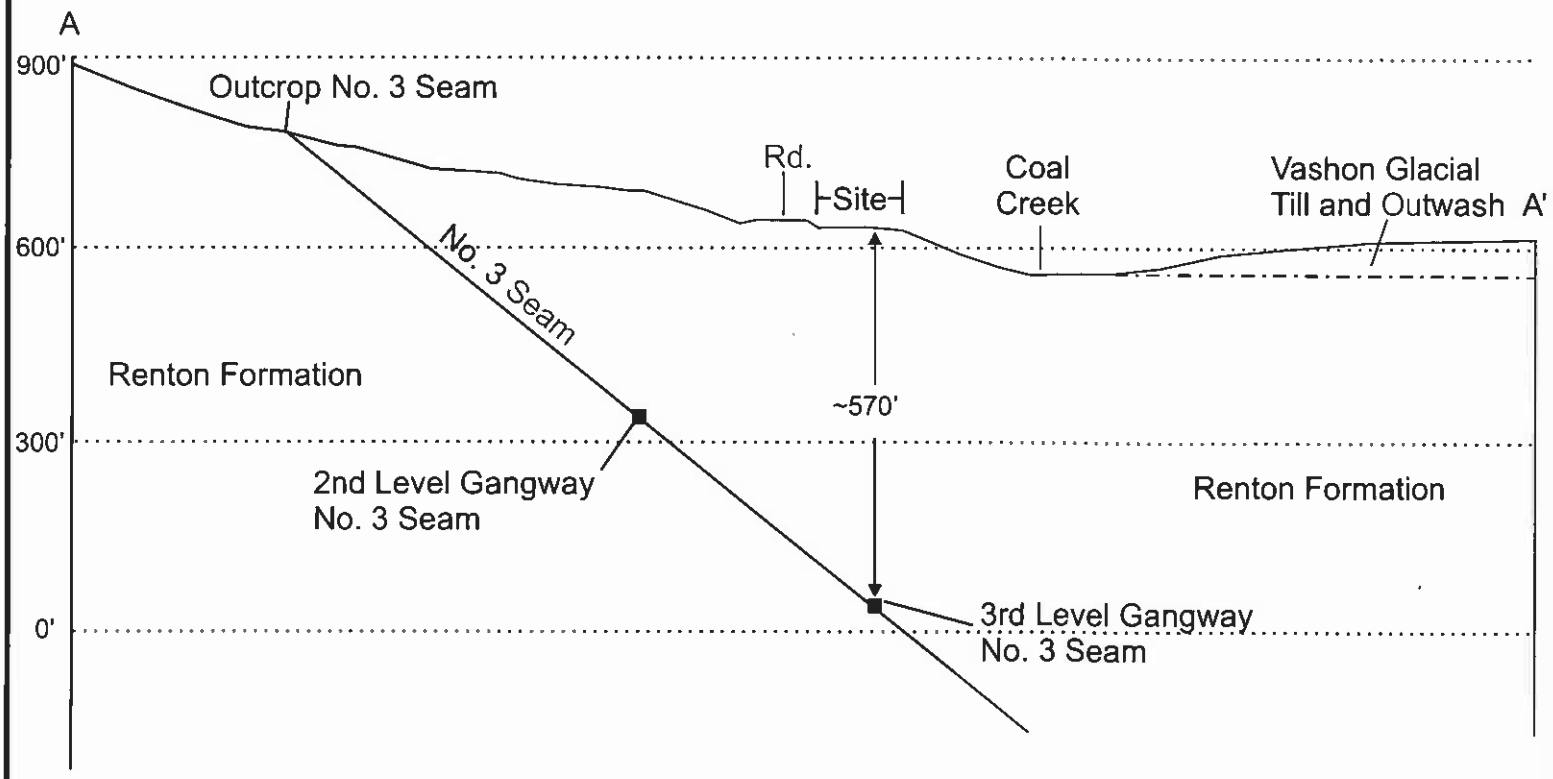
John Kane, L.G., L.H.G.
Principal

PH/jk

Attachments: Figures (3)



KANE ENVIRONMENTAL INC	Coal Mine Evaluation - Proposed Parking Area Bellevue, Washington			Vicinity Map Figure 1
	3/18/10	By: PH	Source: Topo 2003	



Note: The No. 3 Seam was Projected Using a Dip of 38 Degrees Per Historic Mine Data and Publication Information

Geologic Contact (Approximate)

Approximate Graphic Scale
150 0 150 300
(In Feet)
1 inch = 300 feet

KANE ENVIRONMENTAL INC

Coal Hazard Evaluation - Proposed Parking Area Bellevue, Washington				Cross Section Figure 3
	3/18/10	By: PH	Source: KC Imap, Historic Mine Maps	

KANE ENVIRONMENTAL INC

October 8, 2010

City of Bellevue
Mr. Geoffrey Bradley, Community Parks Supervisor
Natural Resource Division
Parks & Community Services Department
450 – 110th Avenue Northeast
Bellevue, Washington 98009

RE: **LIMITED INFILTRATION EVALUATION**
Within Parcel No. 2624059048
Newcastle Golf Club Road
Bellevue, Washington

Dear Mr. Bradley,

This letter presents our preliminary findings regarding potential stormwater infiltration within an area adjacent to the above referenced site. A senior engineering geologist from our firm visited the site on September 30, 2010 to perform shallow hand excavations in the area of a proposed infiltration basin located west of the trailhead parking lot.

Field Evaluation

Three hand auger borings were advanced to variable depths within the proposed basin to evaluate the shallow subsurface soil and groundwater conditions and to determine whether infiltration would be feasible. We encountered a thin layer of topsoil and vegetation underlain by very loose to loose, organic-laden, fine-grained fill consistent with coal mine tailings. Interlayered within these materials was silty-sand to sandy-silt which was generally loose to medium dense. The excavations were advanced to depths ranging from 4 to 6 feet below the existing grades and the materials became medium dense at the bottom of the excavations.

We also performed a reconnaissance of areas adjacent to the proposed infiltration gallery. We observed a relatively steep slope to the north of the basin (60 to 80 percent) with a height of 30 feet or more. The site is vegetated with evergreen and deciduous trees, blackberries, nettles, grasses, and ferns. The slope area appears to be comprised of old coal tailing material, which is likely on the order of 20 to 30 feet thick in places based on our observations. Some leaning and curved tree trunks were observed along the slope, potentially indicating some level of slope movement (soil creep).

Conclusions and Recommendations

It is our opinion that stormwater infiltration is not feasible in the relatively level area west of the site due to the following factors:

- Existing deep fill materials composed of loose, fine-grained organic-rich soils (infiltration is not generally allowed in fill materials)

- A relatively steep slope area greater than 30 feet in height located just north of the proposed basin (also comprised of fill)

Furthermore, the geologic units in the area of the site include bedrock (sandstone, siltstone, shale), and glacial till; both of which are relatively impermeable.

We recommend either tightlining the stormwater to an appropriate outlet or stormwater infrastructure system, potentially Coal Creek if allowed by the jurisdiction; or dispersing the stormwater with level spreaders in a relatively level area with adequate vegetated flow paths. We can provide additional recommendations as needed. Based on our knowledge of the site and surrounding areas, stormwater dispersion may be challenging due to the topography and current site development (trails).

Limitations

The information presented herein is based upon professional interpretation utilizing standard practices and a degree of conservatism deemed proper for this project. We emphasize that this report is valid for this project as outlined above, and should not be used for any other site.

We hope that this report provides the information required at this time. If you have any questions with this information, please contact our office at (206) 691-0476.

Respectfully submitted,

KANE ENVIRONMENTAL, INC.

Phil Haberman, P.G., P.E.G.
Senior Engineering Geologist

PH/jk

References

King County Imap
"Geologic Map of King County (2007)", Derek Booth, et. al.